AREVAEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Thursday, January 31, 2013 8:26 PM
To: Snyder, Amy
Cc: Miernicki, Michael; DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); WILLS Tiffany (AREVA); WELLS Russell (AREVA); VANCE Brian (AREVA); GUCWA Len (EXTERNAL AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI, Supplement 4
Attachments: RAI 547 Supplement 4 Response US EPR DC.pdf - Adobe Acrobat Pro.pdf

Amy,

AREVA NP Inc. provided a schedule for a technically correct and complete response to the four questions in RAI No. 547 on July 11, 2012. On October 4, 2012, AREVA NP submitted Supplement 1 which provided a technically correct and complete final response to one (03.07.02-77) of the four remaining questions. On November 27, 2012, AREVA NP submitted Supplement 2 which changed the schedule for one of the three remaining questions. On November 29, 2012, AREVA NP submitted Supplement 3 which provided a technically correct and complete final response to one of the three remaining questions.

The attached file, "RAI 547 Supplement 4 Response US EPR DC.pdf" provides a technically correct and complete final response to one of the two remaining questions.

The following table indicates the respective pages in the response document, "RAI 547 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject 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 547, Question 03.06.01-14.

Question #	Start Page	End Page
RAI 547 — 03.06.01-14	2	22

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

Question #	Response Date
RAI 547 — 03.07.02-78	April 30, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, November 29, 2012 12:10 PM
To: Amy.Snyder@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI, Supplement 3

Amy,

AREVA NP Inc. provided a schedule for a technically correct and complete response to the four questions in RAI No. 547 on July 11, 2012. On October 4, 2012, AREVA NP submitted Supplement 1 which provided a technically correct and complete final response to one (03.07.02-77) of the four remaining questions. On November 27, 2012, AREVA NP submitted Supplement 2 which changed the schedule for one of the three remaining questions.

The attached file, “RAI 547 Supplement 3 Response US EPR DC.pdf” provides a technically correct and complete final response to one of the three remaining questions.

The following table indicates the respective pages in the response document, “RAI 547 Supplement 3 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject 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 547, Question 03.07.02-76.

Question #	Start Page	End Page
RAI 547 — 03.07.02-76	2	14

The schedule for a technically correct and complete response to the remaining 2 questions is unchanged and is provided below.

Question #	Response Date
RAI 547 — 03.07.02-14	January 31, 2013
RAI 547 — 03.07.02-78	April 30, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
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From: WILLIFORD Dennis (RS/NB)
Sent: Tuesday, November 27, 2012 12:40 PM
To: Amy.Snyder@nrc.gov

Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI, Supplement 2

Amy,

AREVA NP Inc. provided a schedule for a technically correct and complete response to the four questions in RAI No. 547 on July 11, 2012. On October 4, 2012, AREVA NP submitted Supplement 1 which provided a technically correct and complete final response to one (03.07.02-77) of the four remaining questions.

The schedule for a technically correct and complete response to the 1 of the remaining 3 questions has been changed as provided below.

Question #	Response Date
RAI 547 — 03.06.01-14	**January 31, 2013**
RAI 547 — 03.07.02-76	November 29, 2012
RAI 547 — 03.07.02-78	April 30, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, October 17, 2012 2:07 PM
To: Amy.Snyder@nrc.gov
Cc: Michael.Miernicki@nrc.gov; BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); GARDNER Darrell (RS/NB) (Darrell.Gardner@areva.com); VANCE Brian (RS/NB); WELLS Russell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI, Question 03.06.01-14 - STATUS

Amy,
AREVA appreciates the initial comments received from NRC staff during our telecon on September 25th, the e-mail with additional comments received on September 27th, and the additional comments and status update on the review status of the DRAFT RAI 547 Question 03.06.01-14 response (submitted on August 17, 2012) which were provided by Mike Miernicki on October 15th. We understand that the NRC staff needs additional time to complete their review and provide final comments on the Draft response. AREVA will provide a revised schedule for submittal of the final response to this question after receipt and evaluation of all NRC staff comments.

The schedule for a technically correct and complete final response to the other 2 questions remains unchanged as shown below.

Question #	Response Date
RAI 547 — 03.06.01-14	**TBD**
RAI 547 — 03.07.02-76	November 29, 2012
RAI 547 — 03.07.02-78	April 30, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: RYAN Tom (RS/NB)
Sent: Thursday, October 04, 2012 1:33 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); WILLIFORD Dennis (RS/NB); ABAYAN Victor (EP/PE)
Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to the four questions in RAI No. 547 on July 11, 2012.

The attached file, “RAI 547 Supplement 1 Response US EPR DC.pdf” provides a technically correct and complete final response to one of the four remaining questions.

The following table indicates the respective pages in the response document, “RAI 547 Supplement 1 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject question. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the responses to RAI 547 Question 03.07.02-77.

Question #	Start Page	End Page
RAI 547 — 03.07.02-77	2	2

The schedule for a technically correct and complete response to the remaining 3 questions is unchanged and is provided below.

Question #	Response Date
RAI 547 — 03.06.01-14	**October 17, 2012**
RAI 547 — 03.07.02-76	**November 29, 2012**
RAI 547 — 03.07.02-78	**April 30, 2013**

Sincerely,

Tom Ryan for
Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, July 11, 2012 2:52 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); Michael.Miernicki@nrc.gov; WELLS Russell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 547 Response US EPR DC.pdf," provides a schedule since a technically correct and complete response to the four questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 547 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 547 — 03.06.01-14	2	2
RAI 547 — 03.07.02-76	3	4
RAI 547 — 03.07.02-77	5	5
RAI 547 — 03.07.02-78	6	12

The schedule for a technically correct and complete response to these 4 questions is provided below.

Question #	Response Date
RAI 547 — 03.06.01-14	**October 17, 2012**
RAI 547 — 03.07.02-76	**November 29, 2012**
RAI 547 — 03.07.02-77	**November 14, 2012**
RAI 547 — 03.07.02-78	**April 30, 2013**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, June 15, 2012 2:45 AM
To: ZZ-DL-A-USEPR-DL
Cc: Xu, Jim; Thomas, Brian; Miernicki, Michael; Clark, Phyllis; Segala, John; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI

Attached please find the subject request for additional information (RAI). A draft of the RAI was provided to you on May 17, 2012, and June 12, 2012, 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/LB1
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 4206

Mail Envelope Properties (554210743EFE354B8D5741BEB695E6560BFC25)

Subject: Response to U.S. EPR Design Certification Application RAI No. 547 (6499, 6359), FSAR Ch. 3 - NEW PHASE 4 RAI, Supplement 4
Sent Date: 1/31/2013 8:25:45 PM
Received Date: 1/31/2013 8:26:04 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
"Miernicki, Michael" <Michael.Miernicki@nrc.gov>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"LEIGHLITER John (AREVA)" <John.Leighliter@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"WILLS Tiffany (AREVA)" <Tiffany.Wills@areva.com>
Tracking Status: None
"WELLS Russell (AREVA)" <Russell.Wells@areva.com>
Tracking Status: None
"VANCE Brian (AREVA)" <Brian.Vance@areva.com>
Tracking Status: None
"GUCWA Len (EXTERNAL AREVA)" <Len.Gucwa.ext@areva.com>
Tracking Status: None
"Snyder, Amy" <Amy.Snyder@nrc.gov>
Tracking Status: None

Post Office: FUSLYNCMX03.fdom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	11775	1/31/2013 8:26:04 PM
RAI 547 Supplement 4 Response US EPR DC.pdf - Adobe Acrobat Pro.pdf	896155	

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

Response to

Request for Additional Information No. 547(6499, 6359), Revision 0,
Supplement 4

6/15/2012

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.06.01 - Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment
SRP Section: 03.07.02 - Seismic System Analysis

Application Section: Tier 2 Table 1.8-2

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

Question 03.06.01-14:

Open Item

Follow-up RAI to RAI 533, Question 3.6.1-13

Following the issuance of RAI 533, Question 3.6.1-13 on COL Information Items (I/Is) 3.6-1 and 3.6-2, it was identified by the staff that there are a number of similar COL I/Is in U.S. FSAR Tier 2, Table 1.8-2, that cannot theoretically be completed by the COL applicants prior to issuance of a COL license. This issue was discussed with the AREVA and COL applicants in an EPR DCWG public meeting. In their response to RAI 533 Question 3.6.1-13, AREVA chose to only respond to address that specific instance, versus the generic problem.

Generally, the proposed FSAR Tier 2 Table 1.8-2 COL I/Is are technically appropriate, however, as currently worded some present a design certification legal issue. As written, they cannot be completed prior to the issuance of a COLA. For example, the COL I/I may require: 1) as-built information to be provided, 2) completion of examinations, or 3) other information that has to be provided prior to fuel load. These COL I/Is may be revised in several different ways depending on how they are currently worded as follows:

A. COL I/Is that can be reworded in an acceptable manner so they can be completed by the COL applicant.

B. COL I/Is that duplicate, to some extent, an existing ITAAC, can be reworded to limit the scope of the COL I/I while retaining the ITAAC.

C. COL I/Is that entirely duplicate an existing ITAAC can be deleted

D. COL I/Is that can be deleted, and a new ITAAC be created, or the scope of an existing ITAAC be expanded.

The applicant is requested to review the entire COL I/Is and any associated ITAAC with the above concepts and situations in mind, and make the appropriate changes to both the FSAR Tier 2 Table 1.8-2 COL I/Is, and to the various Tier 1 ITAAC tables.

Response to Question 03.06.01-14:

AREVA NP has reviewed each of the COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2. Table 03.06.01-14-1 lists those COL I/Is that will be deleted or modified based on the criteria in the NRC Question. The results of this review are summarized in the following table:

Category	Number of Applicable COL I/Is	COL I/Is
A	15	3.5-1, 3.9-4, 3.12-3, 3.12-4, 3.12-5, 7.1-2, 8.3-1, 10.2-2, 10.2-3, 10.3-2, 15.0-1, 17.6-8, 19.1-4, 19.1-9, 19.2-1
B	2	3.6-4, 3.9-2
C	6	3.4-4, 3.6-3, 3.10-1, 3.11-1, 9.5-16, 9.5.17
D	2	3.4-5, 3.9-11
N/A[1]	3	3.9-3, 3.9-14, 3.12-6

As a result of the changes to the COL I/Is above, corresponding changes will be made to U.S. EPR FSAR Tier 1, Chapters 2 and 3 (see Tables 03.06.01-14-2 through 03.06.01-14-5 of the RAI response); U.S. EPR FSAR Tier 2, Sections 3.4.1, 3.5.1.2.3, 3.6.2.5.1, 3.6.3, 3.9.3, 3.10.4, 3.11, 3.12, 7.7.2.3.5, 8.3.1.1.5, 9.5.1, 10.2.3, 10.3.6.3, 15.0.0.3.9, 17.6.8, 19.1.2, and 19.2.5; and U.S. EPR FSAR Tier 2, Table 1.8-2.

FSAR Impact:

U.S. EPR FSAR Tier 1, Chapters 2 and 3, will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 2, Sections 3.4.1, 3.5.1.2.3, 3.6.2.5.1, 3.6.3, 3.9.3, 3.10.4, 3.11, 3.12, 7.7.2.3.5, 8.3.1.1.5, 9.5.1, 10.2.3, 10.3.6.3, 15.0.0.3.9, 17.6.8, 19.1.2, and 19.2.5; and U.S. EPR FSAR Tier 2, Table 1.8-2, will be revised as described in the response and indicated on the enclosed markup.

[1] Changes to these COL information Items will be addressed in a revised RAI response.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.4-4	A COL applicant that references the U.S. EPR design certification will perform internal flooding analyses prior to fuel load for the Safeguard Buildings and Fuel Building to demonstrate that the impact of internal flooding is contained within the Safeguard Building or Fuel Building division of origin.	3.4.1	C	Delete COL item, this is redundant to ITAAC Tier 1 Table 2.1.1-10, Item 2.2, and Table 2.1.1-11, acceptance criteria f and g. The internal flooding analysis for the safeguard buildings and fuel buildings are described in U.S. EPR FSAR Tier 2, Section 3.4, and verified by ITAAC.
3.4-5	A COL applicant that references the U.S. EPR design certification will perform an internal flooding analysis prior to fuel load for the Reactor Building and Reactor Building Annulus to demonstrate that the essential equipment required for safe shutdown is located above the internal flood level.	3.4.1	D	Delete COL item, this is redundant to ITAAC Tier 1 Table 2.1.1-8, item 2.10. The internal flooding analysis for the Reactor Building and Reactor Building Annulus are described in U.S. EPR FSAR Tier 2, Section 3.4, and verified by ITAAC. Revisions to U.S. EPR FSAR Tier 2, Section 3.4 and Tier 1 Table 2.1.1-8, item 2 will be addressed in a revision to RAI 218 Question 03.04.01-8.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.5-1	A COL applicant that references the U.S. EPR design certification will describe controls to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be removed from containment prior to operation, moved to a location where it is not a potential hazard to SSC important to safety, or seismically restrained to prevent it from becoming a missile.	3.5.1.2.3	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will describe ***essential elements of a program*** ~~controls~~ to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be removed from containment prior to operation, moved to a location where it is not a potential hazard to SSC important to safety, or seismically restrained to prevent it from becoming a missile.
3.6-3	A COL applicant that references the U.S. EPR design certification will confirm that the design LBB analysis remains bounding for each piping system and provide a summary of the results of the actual as-built plant specific LBB analysis, including material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms.	3.6.3	C	U.S. EPR FSAR Tier 1, Table 2.2.1-5, Item 3.7, includes an ITAAC on LBB. The design report that will be prepared to close out this ITAAC will include the information in this COL item. The COL item will be deleted and U.S. EPR FSAR Tier 2, Section 3.6.3, will be revised to state “A design report will confirm that the design LBB analysis remains bounding for each piping system and provide a summary of the results of the actual as-built, plant-specific LBB analysis, including material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms.”

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.6-4	A COL applicant that references the U.S. design certification will provide diagrams showing the final as-designed configurations, locations, and orientations of the pipe whip restraints in relation to break locations in each piping system.	3.6.2.5.1	B	Revise COL item to delete “final as-designed.” U.S. EPR FSAR Tier 1, Table 3.8-1, Item 2.1 requires that a pipe break hazards analysis report demonstrates that pipe whip restraints and jet shield designs for protection of the essential systems and components can mitigate pipe break loads.
3.9-2	A COL applicant that references the U.S. EPR design certification will prepare the design specifications and design reports for ASME Class 1, 2, and 3 components, piping, supports and core support structures that comply with and are certified to the requirements of Section III of the ASME Code. The COL applicant will address the results and conclusions from the reactor internals material reliability programs applicable to the U.S. EPR reactor internals with regard to known aging degradation mechanisms such as irradiation-assisted stress corrosion cracking and void swelling.	3.9.3	B	Design reports (including design specifications) for ASME Class 1, 2, and 3 components, piping, supports and core support structures are covered under existing ITAAC (e.g., U.S. EPR FSAR Tier 1, Table 2.2.1-5, Items 3.16, 3.20, 3.21, 3.25, 3.26). Thus, this COL item will be revised to apply to site-specific ASME Code Class 1, 2 and 3 components. The second sentence of this COL information item was added as a result of RAI 339, Supplement 2, is consistent with a similar COL information item in the AP1000 design certification, and provides the COLA the flexibility to address this information either in the design specifications and design reports, or through a separate stand alone document.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.9-3	A COL applicant that references the U.S. EPR design certification will examine the feedwater line welds after hot functional testing prior to fuel loading and at the first refueling outage, in accordance with NRC Bulletin 79-13. A COL applicant that references the U.S. EPR design certification will report the results of inspections to the NRC, in accordance with NRC Bulletin 79-13.	3.9.3.1.1	N/A	Deletion of this COL item will be addressed in a revision to RAI 338 Suppl 2, Question 03.09.03-2.
3.9-4	As noted in ANP-10264NP-A, a COL applicant that references the U.S. EPR design certification will confirm that thermal deflections do not create adverse conditions during hot functional testing.	3.9.3.1.1	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will ***describe essential elements of a program to*** confirm that thermal deflections do not create adverse conditions during hot functional testing.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.9-11	A COL applicant that references the U.S. EPR design certification will provide a summary of the maximum total stress, deformation (where applicable), and cumulative usage factor values for each of the component operating conditions for ASME Code Class 1 components. For those values that differ from the allowable limits by less than 10 percent, the COL applicant will provide the contribution of each of the loading categories (e.g., seismic, pipe rupture, dead weight, pressure, and thermal) to the total stress for each maximum stress value identified in this range. The COL applicant will also provide the maximum total stress and deformation values for each operating condition for Class 2 & 3 components required for safe shutdown of the reactor, or mitigation of consequences of a postulated piping failure without offsite power. Identification of those values that differ from the allowable limits by less than 10 percent will also be provided.	3.9.3.1	D	The information required by this COL item will be included in stress reports which follow the ASME guidelines for design reports (Section III Division 1 Appendix C). Therefore, the COL item will be deleted and U.S. EPR FSAR Tier 2, Section 3.9.3.1 will be revised accordingly. Additionally, new ITAAC will be added to U.S. EPR FSAR Tier 1, Chapters 2 and 3 to reflect the information in this COL information item. The changes in the Description column in U.S. EPR FSAR Tier 1, Table 2.2.8-1 are consistent with the description of these components in U.S. EPR FSAR Tier 2, Table 3.2.2-1.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.9-14	A COL applicant that references the U.S. EPR design certification will provide a summary of reactor core support structure maximum total stress, deformation, and cumulative usage factor values for each component and each operating condition in conformance with ASME Section III, Subsection NG.	3.9.5.2	N/A	Deletion of this COL item will be addressed in revision to RAI 291, Question 03.09.05-26.
3.10-1	A COL applicant that references the U.S. EPR design certification will create and maintain the SQDP file during the equipment selection and procurement phase.	3.10.4	C	ITAAC acceptance criteria exist (e.g., U.S. EPR FSAR Tier 1, Table 2.2.1-5, Item 3.3, Table 2.2.3-3, Item 3.4) which require the development of SQDPs. Thus, this COL item can be deleted. U.S. EPR FSAR Tier 2, Section 3.10.4, will be revised to state that SQDP files are created and maintained during the equipment selection and procurement phase.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.11-1	A COL applicant that references the U.S. EPR design certification will maintain the equipment qualification test results and qualification status file during the equipment selection, procurement phase and throughout the installed life in the plant.	3.11	C	ITAAC acceptance criteria exist (e.g., U.S. EPR FSAR Tier 1, Table 2.2.1-5, Item 6.1, Table 2.2.3-3, Item 6.1) which require the development of EQDPs which contain the equipment qualification test results and qualification status. Thus, this COL item can be deleted. U.S. EPR FSAR Tier 2, Section 3.10.4, will be revised to state that equipment qualification test results and qualification status file are maintained during the equipment selection, procurement phase and throughout the installed life in the plant.
3.12-3	A COL applicant that references the U.S. EPR design certification will monitor the RHR/SIS/ EBS injection piping from the RCS to the first isolation valve (all four trains), and RHR/SIS suction piping from the RCS to the first isolation valve (trains 1 and 4) during the first cycle of the first U.S. EPR initial plant operation to verify that operating conditions have been considered in the design unless data from a similar plant's operation demonstrates that thermal oscillation is not a concern for piping connected to the RCS.	3.12.5.9	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification ***will describe essential elements of a program to*** monitor the RHR/SIS/ EBS injection piping from the RCS to the first isolation valve (all four trains), and RHR/SIS suction piping from the RCS to the first isolation valve (Trains 1 and 4) during the first cycle of the first U.S. EPR initial plant operation to verify that operating conditions have been considered in the design unless data from a similar plant's operation demonstrates that thermal oscillation is not a concern for piping

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.12-4	A COL applicant that references the U.S. EPR design certification will monitor pressurizer surge line temperatures during the first fuel cycle of initial plant operation to verify that the design transients for the surge line are representative of actual plant operations.	3.12.5.10.1	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification ***will describe essential elements of a program to*** monitor pressurizer surge line temperatures during the first fuel cycle of initial plant operation to verify that the design transients for the surge line are representative of actual plant operations.
3.12-5	A COL applicant that references the U.S. EPR design certification will monitor the normal spray line temperatures during the first cycle of the first U.S. EPR initial plant operation to verify that the design transients for the normal spray are representative of actual plan operations unless data from a similar plant's operation determines that monitoring is not warranted.	3.12.5.10.3	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification ***will describe essential elements of a program to*** monitor the normal spray line temperatures during the first cycle of the first U.S. EPR initial plant operation to verify that the design transients for the normal spray are representative of actual plan operations unless data from a similar plant's operation determines that monitoring is not warranted.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
3.12-6	A COL applicant that references the U.S. EPR design certification will monitor the temperature of the main feedwater lines during the first cycle of the first U.S. EPR initial plant operation to verify that the design transients for the main feedwater lines are representative of actual plant operations unless data from a similar plant's operation determines that monitoring is not warranted.	3.12.5.10.4	N/A	Deletion of this COL item will be addressed in a revision to RAI 338 Suppl 2, Question 03.09.03-2.
7.1-2	A COL applicant that references the U.S. EPR design certification will, following selection of the actual plant operating instrumentation and calculation of the instrumentation uncertainties of the operating plant parameters, prior to fuel load, calculate the primary power calorimetric uncertainty. The calculations will be completed using an NRC acceptable method and confirm that the safety analysis primary power calorimetric uncertainty bounds the calculated values.	7.7.2.3.5	A	Reword COL item to delete "prior to fuel load."

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
8.3-1	A COL applicant that references the U.S. EPR design certification will monitor and maintain EDG reliability during plant operations to verify the selected reliability level target is being achieved as intended by RG 1.155.	8.3.1.1.5	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will ***establish procedures to*** monitor and maintain EDG reliability during plant operations to verify the selected reliability level target is being achieved as intended by RG 1.155.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
9.5-16	A COL applicant that references the U.S. EPR design certification will perform an as-built, post-fire Safe Shutdown Analysis, which includes final plant cable routing, fire barrier ratings, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The post-fire Safe Shutdown Analysis will demonstrate that safe shutdown performance objectives are met prior to fuel loading and will include a post-fire safe shutdown circuit analysis based on the methodology described in NEI 00-01, “Guidance for Post-Fire Safe-Shutdown Circuit Analysis.”	9.5.1.2.1	C	ITAAC exist for performance of the post-fire safe shutdown analysis (Tier 1 Table 2.1.1-8, items 2.7, 2.24, 2.25, Table 2.1.1-10, item 2.2, Table 2.1.1-11, item 2.2). The acceptance criteria for these ITAAC reflect the information in the COL item and the COL item can be deleted. U.S. EPR FSAR Tier 2, Section 9.5.1.2.1 will be revised to state that the post-fire Safe Shutdown Analysis includes final plant cable routing, fire barrier ratings, purchased equipment, equipment arrangement, and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The post-fire Safe Shutdown Analysis demonstrates that safe shutdown performance objectives are met prior to fuel loading and includes a post-fire safe shutdown circuit analysis based on the methodology described in NEI 00-01, “Guidance for Post-Fire Safe-Shutdown Circuit Analysis.”

Table 03.06.01-14-1
Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
9.5.17	A COL applicant that references the U.S. EPR design certification will evaluate the differences between the as-designed and as-built plant configuration to confirm the Fire Protection Analysis remains bounding. This evaluation will be performed prior to fuel loading and will consider the final plant cable routing, fire barrier ratings, combustible loading, ignition sources, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The applicant will describe how this as-built evaluation will be performed and documented, and how the NRC will be made aware of deviations from the FSAR, if any.	9.5.1.3	C	ITAAC exist for performance of the Fire Protection Analysis (Tier 1 Table 2.1.1-8, items 2.7, 2.24, 2.25, Table 2.1.1-10, item 2.2, Table 2.1.1-11, item 2.2). Therefore, the COL item can be deleted. U.S. EPR FSAR Tier 2, Section 9.5.1.2.1 will be revised to state that the Fire Protection Analysis includes an evaluation of the final plant cable routing, fire barrier ratings, purchased equipment, and equipment arrangement.
10.2-2	A COL applicant that references the U.S. EPR design certification will provide applicable material properties of the turbine rotor, including the method of calculating the fracture toughness properties, after the site-specific turbine has been procured.	10.2.3.1	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will provide applicable material properties of the ***site-specific*** turbine rotor, including the method of calculating the fracture toughness properties~~, after the site-specific turbine has been procured~~.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
10.2-3	A COL applicant that references the U.S. EPR design certification will provide applicable turbine disk rotor specimen test data, load- displacement data from the compact tension specimens and the fracture toughness properties after the site-specific turbine has been procured.	10.2.3.2	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will provide applicable ***site-specific*** turbine disk rotor specimen test data, load- displacement data from the compact tension specimens and the fracture toughness properties ~~after the site-specific turbine has been procured~~.
10.3-2	A COL applicant that references the U.S. EPR design certification will develop and implement a FAC condition monitoring program that is consistent with Generic Letter 89-08 and NSAC-202L-R3 for the carbon steel portions of the steam and power conversion systems that contain water or wet steam prior to initial fuel loading.	10.3.6.3	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will ***describe essential elements of*** ~~develop and implement~~ a FAC condition monitoring program that is consistent with Generic Letter 89-08 and NSAC-202L-R3 for the carbon steel portions of the steam and power conversion systems that contain water or wet steam ~~prior to initial fuel loading~~.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
15.0-1	A COL applicant that references the U.S. EPR design certification will provide for staff review, prior to the first cycle of operation, a report that demonstrates compliance with the following items: • Examine fuel assembly characteristics to verify that they are hydraulically compatible based on the criterion that a single package of assembly specific critical heat flux (CHF) correlations can be used to evaluate the assembly performance. • Verify that uncertainties used in the setpoint analyses are appropriate for the plant and cycle being analyzed. • Verify that the DNBR and LPD satisfy SAFDL with a 95/95 assurance. • Review the U.S. EPR FSAR Tier 2 analysis results for the first cycle to confirm that the static setpoint value provides adequate protection for at least three limiting AOO.	15.0.0.3.9	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will provide for staff review a report that demonstrates compliance with the following items ***applicable to the first cycle of operation***: • Examine fuel assembly characteristics to verify that they are hydraulically compatible based on the criterion that a single package of assembly specific critical heat flux (CHF) correlations can be used to evaluate the assembly performance. • Verify that uncertainties used in the setpoint analyses are appropriate for the plant and cycle being analyzed. • Verify that the DNBR and LPD satisfy SAFDL with a 95/95 assurance. • Review the U.S. EPR FSAR Tier 2 analysis results for the first cycle to confirm that the static setpoint value provides adequate protection for at least three limiting AOO.

Table 03.06.01-14-1

Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
17.6-8	A COL applicant that references the U.S. EPR design certification will describe the plan or process for implementing the Maintenance Rule Program as described in the COL application, which includes establishing program elements through sequence and milestones and monitoring or tracking the performance and/ or condition of SSC as they become operational. The Maintenance Rule Program will be implemented by the time that fuel load is authorized.	17.6.8	A	Revise COL item to delete "The Maintenance Rule Program will be implemented by the time that fuel load is authorized."
19.1-4	A COL applicant that references the U.S. EPR design certification will conduct a peer review of the PRA relative to the ASME PRA Standard prior to use of the PRA to support risk-informed applications or before fuel load.	19.1.2.3	A	Revise COL item to delete "or before fuel load."

Table 03.06.01-14-1
Review of COL I/Is in U.S. EPR FSAR Tier 2, Table 1.8-2

Item No.	Description	Section	Classification (see key at end of table)	Disposition
19.1-9	A COL applicant that references the U.S. EPR design certification will review as-designed and as-built information and conduct walk-downs as necessary to confirm that the assumptions used in the PRA (including PRA inputs to RAP and SAMDA) remain valid with respect to internal events, internal flood and fire events (routings and locations of pipe, cable and conduit), and HRA analyses (development of operating procedures, emergency operating procedures and severe accident management guidelines and training), external events including PRA-based seismic margins HCLPF fragilities, and LPSD procedures.	19.1.2.2	A	Reword COL item as follows: A COL applicant that references the U.S. EPR design certification will ***describe the process to*** review as-designed and as-built information and conduct walk-downs as necessary to confirm that the assumptions used in the PRA (including PRA inputs to RAP and SAMDA) remain valid with respect to internal events, internal flood and fire events (routings and locations of pipe, cable and conduit), and HRA analyses (development of operating procedures, emergency operating procedures and severe accident management guidelines and training), external events including PRA-based seismic margins HCLPF fragilities, and LPSD procedures.
19.2-1	A COL applicant that references the U.S. EPR design certification will develop and implement severe accident management guidelines prior to fuel loading using the Operating Strategies for Severe Accidents (OSSA) methodology described in U.S. EPR FSAR Section 19.2.5.	19.2.5	A	Revise COL item to delete “prior to fuel loading.”

Key:

A COL I/Is that can be reworded in an acceptable manner so they can be completed by the COL applicant.

B COL I/Is that duplicate, to some extent, an existing ITAAC, can be reworded to limit the scope of the COL I/I while retaining the ITAAC.

C COL I/Is that entirely duplicate an existing ITAAC can be deleted

D COL I/Is that can be deleted, and a new ITAAC be created, or the scope of an existing ITAAC be expanded.

N/A Changes to these COL information Items will be addressed in a future revised RAI response.

Table 03.06.01-14-2—New ITAAC for ASME Code Section III, Class 1 Component Design

3.x The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1, components comply with ASME Code, Section III requirements.

Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.	An analysis will be performed to determine the maximum total stress, deformation, and cumulative usage factor values for each of the ASME Code, Section III, Class 1 component operating conditions.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with the ASME Code, Section III, NB-3200 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent and provide the contribution of each of the loading categories to the total stress for each maximum stress value identified in this range.

Table 03.06.01-14-3—New ITAAC for ASME Code Section III, Class 1 Component Design

U.S. EPR FSAR Tier 1 Section	Design Commitment and ITAAC number
2.2.1	3.23
2.2.1	3.15
2.2.3	3.13
2.2.6	3.13
2.2.7	3.13

Table 03.06.01-14-4— New ITAAC for ASME Code Section III, Class 2 & 3 Component Design

3.x The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.

Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3200 and ND-3300 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.

Table 03.06.01-14-5— New ITAAC for ASME Code Section III, Class 2 & 3 Component Design

U.S. EPR FSAR Tier 1 Section	Design Commitment and ITAAC number
2.2.1	3.24
2.2.2	3.12
2.2.3	3.14
2.2.4	3.12
2.2.5	3.13
2.2.6	3.14
2.2.7	3.14
2.2.8	3.10
2.3.3	3.13
2.5.4	3.20
2.6.8	3.14
2.7.1	3.13
2.7.2	3.13
2.7.11	3.10
2.8.2	3.9
2.8.6	3.10
2.8.7	3.9
3.5	3.11

U.S. EPR Final Safety Analysis Report Markups

3.15 The design and service stress limits and deformation criteria for RPV internals comply with ASME Code Section III requirements.~~Deleted.~~

3.16 RPV internals listed in Table 2.2.1-1 are designed in accordance with ASME Code Section III, Subsection NG requirements.

3.17 Core support structure welds meet ASME Code Section III non-destructive examination requirements.

3.18 The RPV internals are provided with irradiation specimen guide baskets to hold capsules containing RPV material surveillance specimens.

3.19 Each RCP contains an oil collection system.

3.20 Deleted.

3.21 Deleted.

3.22 Deleted.

3.23 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~

3.24 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~

3.25 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.26 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.27 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.28 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.29 The RCP flywheel maintains its structural integrity during an overspeed event.

3.30 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Tables 2.2.1-2 and 2.2.1-3 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.1-2.

Table 2.2.1-5—Reactor Coolant System ITAAC
Sheet 4 of 12

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.9	The RCS allows movement of the equipment for thermal expansion and contraction.	a. An analysis will be performed to determine the clearances and gaps between as-built RCS equipment supports. b. An inspection of the RCS will be performed to verify the clearances and gaps for as-built RCS equipment supports conform to the approved design.	a. A report defines clearances and gaps between RCS equipment supports. b. The measured clearances and gaps conform to the approved design for RCS equipment supports.
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.
3.14	Deleted.	Deleted.	Deleted.
3.15	The design and service stress limits and deformation criteria for RPV internals comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress, deformation, and cumulative usage factor values for the RPV internals operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for RPV internals comply with the ASME Code Section III, NG-3200 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent and provide the contribution of each of the loading categories to the total stress for each maximum stress value identified in this range.~~Deleted.~~

Table 2.2.1-5—Reactor Coolant System ITAAC
Sheet 6 of 12

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.20	Deleted.	Deleted.	Deleted.
3.21	Deleted.	Deleted.	Deleted.
3.22	Deleted.	Deleted.	Deleted.
3.23	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.Deleted.	An analysis will be performed to determine the maximum total stress, deformation, and cumulative usage factor values for each of the ASME Code, Section III, Class 1 component operating conditions.Deleted.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with the ASME Code Section III, NB-3200 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent and provide the contribution of each of the loading categories to the total stress for each maximum stress value identified in this range.Deleted.
3.24	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.Deleted.	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.Deleted.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.Deleted.
3.25	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements. ~~Deleted.~~

3.13 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.14 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.15 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.16 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.17 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.2.2-2 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.2-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.2.2-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

4.4 Deleted.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.2.2-2 are powered from the Class 1E division as listed in Table 2.2.2-2 in a normal or alternate feed condition.

5.2 Deleted.

6.0 Environmental Qualifications

6.1 Equipment designated as harsh environment in Table 2.2.2-2 will perform the function listed in Table 2.2.2-1 under normal environmental conditions, containment

Table 2.2.2-3—In-Containment Refueling Water Storage Tank System ITAAC
Sheet 2 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 2.2.2-1 to verify that the equipment, including anchorage, are installed per the approved design requirements.	b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 2.2.2-1, including anchorage, are installed per the approved design requirements.
3.4	Deleted.	Deleted.	Deleted.
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	Deleted.	Deleted.	Deleted.
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.13	ASME Code Class 1, 2, and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550, and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

3.7 Deleted.

3.8 Deleted.

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 Deleted.

3.13 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~

3.14 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~

3.15 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.16 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.17 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.18 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.19 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.2.3-2 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.3-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.2.3-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

4.4 Interlocks for the SIS/RHRS initiate the following:

- Opening of the accumulator injection path.

All indicated changes are in response to RAI 547, Question 03.06.01-14

Table 2.2.3-3—Safety Injection System and Residual Heat Removal System ITAAC Sheet 3 of 10

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress, deformation, and cumulative usage factor values for each of the ASME Code, Section III, Class 1 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with the ASME Code Section III, NB-3200 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent and provide the contribution of each of the loading categories to the total stress for each maximum stress value identified in this range.~~Deleted.~~
3.14	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.15	ASME Code Class 1, 2, and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist(s) that meet the requirements of NCA-3550, and conclude that the design of the ASME Code Class 1, 2, and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~

3.13 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.14 Deleted.

3.15 As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.

3.16 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.17 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.18 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.2.4-2 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.4-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.2.4-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.2.4-2 are powered from the Class 1E division as listed in Table 2.2.4-2 in a normal or alternate feed condition.

5.2 Deleted.

6.0 Environmental Qualifications

6.1 Equipment designated as harsh environment in Table 2.2.4-2 will perform the function listed in Table 2.2.4-1 under normal environmental conditions, containment

Table 2.2.4-3—Emergency Feedwater System ITAAC
Sheet 2 of 6

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.4	Equipment identified as Seismic Category I in Table 2.2.4-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.2.4-1.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment identified as Seismic Category I in Table 2.2.4-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 2.2.4-1 to verify that the equipment, including anchorage, are installed per the approved design requirements.	a. Test/analysis reports conclude that the equipment identified as Seismic Category I in Table 2.2.4-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.2.4-1 including the time required to perform the listed function. b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 2.2.4-1, including anchorage, are installed per the approved design requirements.
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	Deleted.	Deleted.	Deleted.
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements. ~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions. ~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent. ~~Deleted.~~

3.6 Deleted.

3.7 Deleted.

3.8 Deleted.

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 Deleted.

3.13 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~

3.14 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.15 As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.

3.16 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.17 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.18 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.2.5-2 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.5-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.2.5-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.2.5-2 are powered from the Class 1E division as listed in Table 2.2.5-2 in a normal or alternate feed condition.

Table 2.2.5-3—Fuel Pool Cooling and Purification System ITAAC
Sheet 3 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.14	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}
3.15	As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.	A reconciliation analysis of ASME Code Class 1, 2, and 3 components will be performed.	ASME Code Design Report(s) exist that meet the requirements of NCA-3550, conclude that the design reconciliation has been completed for as-built ASME Code Class 1, 2 and 3 components, and document the results of the reconciliation analysis.
3.16	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.	An inspection of the as-built pressure-boundary welds in ASME Code Class 1, 2 and 3 components will be performed.	ASME Code reports(s) exist that conclude that ASME Code Section III requirements are met for non-destructive examination of pressure-boundary welds in ASME Code Class 1, 2 and 3 components.

3.6	Deleted.
3.7	Deleted.
3.8	Deleted.
3.9	Deleted.
3.10	Deleted.
3.11	Deleted.
3.12	Deleted.
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~
3.14	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~
3.15	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.
3.16	As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.
3.17	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.
3.18	ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.
3.19	ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
4.0	**I&C Design Features, Displays, and Controls**
4.1	Displays listed in Table 2.2.6-2 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.6-2.
4.3	Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.2.6-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.
4.4	Interlocks for the CVCS initiate the following:

Table 2.2.6-3—Chemical and Volume Control System ITAAC
Sheet 3 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress, deformation, and cumulative usage factor values for each of the ASME Code, Section III, Class 1 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with the ASME Code Section III, NB-3200 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent and provide the contribution of each of the loading categories to the total stress for each maximum stress value identified in this range.~~Deleted.~~
3.14	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.15	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 Deleted.

3.13 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~

3.14 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~

3.15 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.16 As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.

3.17 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.18 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.19 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.2.7-2 are indicated on the PICS operator workstations in the main control room (MCR) and the remote shutdown station (RSS).

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.2.7-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.2.7-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.2.7-2 are powered from the Class 1E division as listed in Table 2.2.7-2 in a normal or alternate feed condition.

5.2 Deleted.

Table 2.2.7-3—Extra Borating System ITAAC
Sheet 3 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress, deformation, and cumulative usage factor values for each of the ASME Code, Section III, Class 1 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 1 components comply with the ASME Code Section III, NB-3200 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent and provide the contribution of each of the loading categories to the total stress for each maximum stress value identified in this range. ~~Deleted.~~
3.14	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.15	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

3.3 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.4 As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.

3.5 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.6 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.7 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.8 The new and spent fuel storage racks maintain the effective neutron multiplication factor less than the required limits during normal operations, during and after design basis seismic events, and during and after design basis dropped fuel assembly accidents.

3.9 Deleted.

3.10 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~

3.11 Deleted.

3.12 Deleted.

3.13 Deleted.

3.14 Deleted.

3.15 The lift height of the Refueling Machine and Spent Fuel Machine gripper masts is limited such that the dose rate is less than 2.5 mrem/hr at the normal operating water level.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.2.8-2 lists the FHS ITAAC.

All indicated changes are in response to RAI 547, Question 03.06.01-14

Table 2.2.8-1—FHS Equipment Mechanical Design

Description	Tag Number[1]	Location	ASME Code Section III	Function	Seismic Category
New Fuel Elevator	FCD10	Fuel Building	N/A	N/A	N/A
Spent Fuel Machine	FCD01	Fuel Building	N/A	N/A	N/A
Fuel Transfer Tube - Tube and Blind Flange ~~(Fuel Transfer Tube Facility)~~	FCJ05	Fuel Building and Reactor Building	Yes, Class MC	Leak tightness	I
Fuel Transfer Tube - FB gate valve and expansion joints	FCJ05	Fuel Building and Reactor Building	Yes, Class 3	Leak tightness	I
~~Mechanism (~~Fuel Transfer Tube Facility (except FCJ05)	FCJ01	Fuel Building and Reactor Building	N/A	N/A	N/A
Refueling Machine	FCB01	Reactor Building	N/A	N/A	II
Spent Fuel Cask Transfer Facility Penetration Assembly	FCJ12	Fuel Building	N/A	Leak tightness	I
New Fuel Storage Racks	FAA01	Fuel Building	N/A	Fuel storage	I
Spent Fuel Storage Racks	FAB02	Fuel Building	N/A	Fuel storage	I
Spent Fuel Cask Transfer Machine	FCJ10	Fuel Building	N/A	Prevent tipping or dropping of spent fuel cask	I
SFCTF isolation valves connected to the spent fuel cask and Penetration Assembly	FCJ15/16	Fuel Building	Yes, Class 3	Isolation	I

1. Equipment tag numbers are provided for information only and are not part of the certified design.

Table 2.2.8-2—Fuel Handling System ITAAC
Sheet 4 of 4

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.10	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III, ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.
3.14	Deleted.	Deleted.	Deleted.
3.15	The lift height of the Refueling Machine and Spent Fuel Machine gripper masts is limited such that the dose rate is less than 2.5 mrem/hr at the normal operating water level.	a. An analysis will be performed to determine the minimum depth of water shielding required to limit the dose rate to less than 2.5 mrem/hr at the normal operating water level. b. A test will be performed to verify the Refueling Machine gripper mast limit switch prevents lifting the mast above the level required to maintain the minimum depth of water above a fuel assembly. c. A test will be performed to verify the Spent Fuel Machine gripper mast limit switch prevents lifting the mast above the level required to maintain the minimum depth of water above a fuel assembly.	a. A radiological analysis determines the minimum depth of water shielding required to limit the dose rate to less than 2.5 mrem/hr at the normal operating water level. b. The Refueling Machine gripper mast limit switch prevents lifting the mast above the level required to maintain the minimum depth of water above a fuel assembly. c. The Spent Fuel Machine gripper mast limit switch prevents lifting the mast above the level required to maintain the minimum depth of water above a fuel assembly.

3.6 Deleted.

3.7 Deleted.

3.8 Deleted.

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 Deleted.

3.13 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~

3.14 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.15 As-built ASME Code Class 1, 2, and 3 components are reconciled with the design requirements.

3.16 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.17 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.18 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.3.3-2.

4.2 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.3.3-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.3.3-2 are powered from the Class 1E division as listed in Table 2.3.3-2 in a normal or alternate feed condition.

5.2 Deleted.

Table 2.3.3-3—Severe Accident Heat Removal System ITAAC
Sheet 2 of 5

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 2.3.3-1 to verify that the equipment, including anchorage, are installed per the approved design requirements.	b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 2.3.3-1, including anchorage, are installed per the approved design requirements.
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	Deleted.	Deleted.	Deleted.
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.Deleted.	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.Deleted.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.Deleted.
3.14	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

3.0	**Mechanical Design Features**
3.1	Pumps and valves listed in Table 2.5.4-1 will be functionally designed and qualified such that each pump and valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under conditions ranging from normal operating to design-basis accident conditions.
3.2	Deleted.
3.3	Deleted.
3.4	Deleted.
3.5	Deleted.
3.6	Deleted.
3.7	Equipment identified as Seismic Category I in Table 2.5.4-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.5.4-1.
3.8	Deleted.
3.9	Each EDG has a fuel oil storage tank.
3.10	Each EDG has a fuel oil day tank.
3.11	Each fuel oil transfer pump capacity is greater than EDG fuel oil consumption at the continuous rating.
3.12	Each EDG starting air system is capable of providing air to start the respective EDG without being recharged.
3.13	Check valves listed in Table 2.5.4-1 will function to change position as listed in Table 2.5.4-1 under normal operating conditions.
3.14	Each EDG lubricating oil system provides lubrication to the engine and turbocharger wearing parts during engine operation.
3.15	Each EDG exhaust path has a bypass exhaust path.
3.16	Deleted.
3.17	Deleted.
3.18	Deleted.
3.19	Deleted.
3.20	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~

Table 2.5.4-4—Emergency Diesel Generator ITAAC
Sheet 4 of 9

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.14	Each EDG lubricating oil system provides lubrication to the engine and turbocharger wearing parts during engine operation.	a. An as-built analysis will be performed to demonstrates each EDG lubricating oil system oil volume is capable of supporting at least 7 days of full load operation b. A test will be performed to verify that each EDG and lubricating oil system operating at rated load conditions achieves stable temperatures and pressures.	a. Analysis concludes each EDG lubricating oil system oil volume is capable of supporting at least 7 days of full load operation. b. Each EDG and lubricating oil system operating at rated load conditions achieves stable temperatures and pressures stated in the approved design.
3.15	Each EDG exhaust path has a bypass exhaust path.	Type tests will be performed on the EDG exhaust bypass device to demonstrate rupture pressure limits.	Type test results conclude that the EDG rupture disk will rupture within the pressure limits within the approved design.
3.16	Deleted.	Deleted.	Deleted.
3.17	Deleted.	Deleted.	Deleted.
3.18	Deleted.	Deleted.	Deleted.
3.19	Deleted.	Deleted.	Deleted.
3.20	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III, ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~

3.0 Mechanical Design Features

3.1 Valves listed in Table 2.6.8-1 will be functionally designed and qualified such that each valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under design basis accident conditions.

3.2 Deleted.

3.3 Class 1E dampers listed in Table 2.6.8-3 will function to change position as listed in Table 2.6.8-2 under normal operating conditions.

3.4 Equipment identified as Seismic Category I in Tables 2.6.8-1 and 2.6.8-2 can withstand seismic design basis loads without a loss of the function listed in Tables 2.6.8-1 and 2.6.8-2.

3.5 Equipment listed in Table 2.6.8-2 as ASME AG-1 Code are designed in accordance with ASME AG-1 Code requirements.

3.6 Equipment listed in Table 2.6.8-2 as ASME AG-1 Code are fabricated in accordance with ASME AG-1 Code requirements, including welding requirements.

3.7 Equipment listed in Table 2.6.8-2 as ASME AG-1 Code are installed, inspected, and tested in accordance with ASME AG-1 Code requirements.

3.8 Deleted.

3.9 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.10 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.11 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.12 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.13 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.14 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements. ~~Deleted.~~

3.15 Deleted.

3.16 Deleted.

3.17 Deleted.

Table 2.6.8-4—Containment Building Ventilation System ITAAC
Sheet 4 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.14	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.Deleted.	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.Deleted.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.Deleted.
3.15	Deleted.	Deleted.	Deleted.
3.16	Deleted.	Deleted.	Deleted.
3.17	Deleted.	Deleted.	Deleted.
4.1	Displays listed in Table 2.6.8-3 are indicated on the PICS operator workstations in the MCR and the RSS.	a. Tests will be performed to verify that the displays listed in Table 2.6.8-3 are indicated on the PICS operator workstations in the MCR by using test input signals to PICS. b. Tests will be performed to verify that the displays listed in Table 2.6.8-3 are indicated on the PICS operator workstations in the RSS by using test input signals inputs to PICS.	a. Displays listed in Table 2.6.8-3 are indicated on the PICS operator workstations in the MCR. b. Displays listed in Table 2.6.8-3 are indicated on the PICS operator workstations in the RSS.
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.6.8-3.	a. Tests will be performed using controls on the PICS operator workstations in the MCR. b. Tests will be performed using controls on the PICS operator workstations in the RSS.	a. Controls on the PICS operator workstations in the MCR perform the function listed in Table 2.6.8-3. b. Controls on the PICS operator workstations in the RSS perform the function listed in Table 2.6.8-3.

2.3 Physical separation exists between divisions of the CCWS as shown on Figure 2.7.1-1.

3.0 Mechanical Design Features

3.1 Pumps and valves listed in Table 2.7.1-1 will be functionally designed and qualified such that each valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under design basis accident conditions.

3.2 Check valves listed in Table 2.7.1-1 will function to change position as listed in Table 2.7.1-1 under normal operating conditions.

3.3 Deleted.

3.4 Equipment identified as Seismic Category I in Table 2.7.1-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.1-1.

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3.13 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~

3.14 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.15 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.16 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.17 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.18 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 3 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.Deleted.	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.Deleted.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.Deleted.
3.14	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}
3.15	As-built ASME Code Class 1, 2 and 3 are reconciled with the design requirements.	A reconciliation analysis of ASME Code Class 1, 2 and 3 components will be performed.	ASME Code Design Report(s) exist that meet the requirements of NCA-3550, conclude that the design reconciliation has been completed for as-built ASME Code Class 1, 2 and 3 components, and document the results of the reconciliation analysis.
3.16	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.	An inspection of the as-built pressure-boundary welds in ASME Code Class 1, 2 and 3 components will be performed.	ASME Code reports(s) exist that conclude that ASME Code Section III requirements are met for non-destructive examination of pressure-boundary welds in ASME Code Class 1, 2 and 3 components.

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3.8	Deleted.
3.9	Deleted.
3.10	Deleted.
3.11	Deleted.
3.12	Deleted.
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted~~.
3.14	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.
3.15	As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.
3.16	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.
3.17	ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.
3.18	ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1	Displays listed in Table 2.7.2-2 are indicated on the PICS operator workstations in the MCR and the RSS.
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.7.2-2.
4.3	Equipment listed as being controlled by a PACS module in Table 2.7.2-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.
4.4	An interlock for the SCWS Division 1 and 2 or Division 3 and 4 cross-tied condition automatically starts the non-running division chiller and pump(s) if the running division chiller or pump(s) trip.

Table 2.7.2-3—Safety Chilled Water System ITAAC
Sheet 2 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.4	Equipment identified as Seismic Category I in Table 2.7.2-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.2-1.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment identified as Seismic Category I in Table 2.7.2-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 2.7.2-1 to verify that the equipment, including anchorage, are installed per the approved design requirements.	a. Test/analysis reports conclude that the equipment identified as Seismic Category I in Table 2.7.2-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.2-1 including the time required to perform the listed function. b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 2.7.2-1, including anchorage, are installed per the approved design requirements.
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	Deleted.	Deleted.	Deleted.
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 3 component operating conditions.~~Deleted~~.	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III, ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~

3.4 Equipment identified as Seismic Category I in Table 2.7.11-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.11-1.

3.5 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.6 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.7 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.8 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.9 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.10 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~

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

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.7.11-2 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.7.11-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.7.11-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the

Table 2.7.11-3—Essential Service Water System ITAAC
Sheet 3 of 8

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.7	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.	An inspection of the as-built pressure-boundary welds in ASME Code Class 1, 2 and 3 components will be performed.	ASME Code reports(s) exist that conclude that ASME Code Section III requirements are met for non-destructive examination of pressure-boundary welds in ASME Code Class 1, 2 and 3 components.
3.8	ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.	A hydrostatic test will be conducted on ASME Code Class 1, 2 and 3 components that are required to be hydrostatically tested by the ASME Code Section III.	ASME Code Data Report(s) exist and conclude that the results of the hydrostatic test of ASME Code Class 1, 2 and 3 components comply with the requirements of ASME Code Section III.
3.9	ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built construction activities and documentation for ASME Code Class 1, 2 and 3 components will be conducted.	ASME Code Data Report(s) exist that conclude that ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
3.10	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 3 components comply with ASME Code Section III, ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
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3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.
3.14	Deleted.	Deleted.	Deleted.
3.15	Deleted.	Deleted.	Deleted.
3.16	Deleted.	Deleted.	Deleted.

3.3 Equipment identified as Seismic Category I in Table 2.8.2-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.8.2-1.

3.4 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.5 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.6 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.7 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.8 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.9 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~

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4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.8.2-2 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.8.2-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.8.2-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.8.2-2 are powered from the Class 1E division as listed in Table 2.8.2-2 in a normal or alternate feed condition.

5.2 Each main steam relief isolation valve fails closed on loss of power.

5.3 Each MSIV fails closed on loss of hydraulic pressure or loss of power.

Table 2.8.2-3—Main Steam System ITAAC
Sheet 3 of 7

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.6	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.	An inspection of the as-built pressure-boundary welds in ASME Code Class 1, 2 and 3 components will be performed.	ASME Code reports(s) exist that conclude that ASME Code Section III requirements are met for non-destructive examination of pressure-boundary welds in ASME Code Class 1, 2 and 3 components.
3.7	ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.	A hydrostatic test will be conducted on ASME Code Class 1, 2 and 3 components that are required to be hydrostatically tested by the ASME Code Section III.	ASME Code Data Report(s) exist and conclude that the results of the hydrostatic test of ASME Code Class 1, 2 and 3 components comply with the requirements of ASME Code Section III.
3.8	ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built construction activities and documentation for ASME Code Class 1, 2 and 3 components will be conducted.	ASME Code Data Report(s) exist that conclude that ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
3.9	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.

3.5 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.6 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.7 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.8 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.9 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.10 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~

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4.0 Instrumentation and Control (I&C) Design Features, Displays, and Controls

4.1 Displays listed in Table 2.8.6-2 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR perform the function listed in Table 2.8.6-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.8.6-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.8.6-2 are powered from the Class 1E division as listed in Table 2.8.6-2 in a normal or alternate feed condition.

5.2 The main feedwater full load isolation valves (MFWFLIV) fail closed on loss of hydraulic pressure in each redundant dump line.

5.3 Deleted.

Table 2.8.6-3—Main Feedwater System ITAAC
Sheet 3 of 6

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.7	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.	An inspection of the as-built pressure-boundary welds in ASME Code Class 1, 2 and 3 components will be performed.	ASME Code reports(s) exist that conclude that ASME Code Section III requirements are met for non-destructive examination of pressure-boundary welds in ASME Code Class 1, 2 and 3 components.
3.8	ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.	A hydrostatic test will be conducted on ASME Code Class 1, 2 and 3 components that are required to be hydrostatically tested by the ASME Code Section III.	ASME Code Data Report(s) exist and conclude that the results of the hydrostatic test of ASME Code Class 1, 2 and 3 components comply with the requirements of ASME Code Section III.
3.9	ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built construction activities and documentation for ASME Code Class 1, 2 and 3 components will be conducted.	ASME Code Data Report(s) exist that conclude that ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
3.10	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 and 3 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 and 3 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.
3.14	Deleted.	Deleted.	Deleted.

3.5 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.6 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.7 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.8 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.9 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~

3.10 Deleted.

3.11 Deleted.

3.12 Deleted.

3.13 Deleted.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.8.7-2 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.8.7-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.8.7-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

4.4 Interlocks for the SGBS blowdown isolation valves listed in Table 2.8.7-2 result in closure of the affected SG under the following signals:

- EFW actuation signal,
- High main steam activity signal with a partial cooldown signal,
- High SG level signal with a partial cooldown signal,
- High SGBS blowdown activity signal with a partial cooldown signal.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.8.7-2 are powered from the Class 1E division as listed in Table 2.8.7-2 in a normal or alternate feed condition.

Table 2.8.7-3—Steam Generator Blowdown System ITAAC
Sheet 3 of 6

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.9	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 and ND-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.
4.1	Displays listed in Table 2.8.7-2 are indicated on the PICS operator workstations in the MCR and the RSS.	a. Tests will be performed to verify that the displays listed in Table 2.8.7-2 are indicated on the PICS operator workstations in the MCR by using test input signals to PICS. b. Tests will be performed to verify that the displays listed in Table 2.8.7-2 are indicated on the PICS operator workstations in the RSS by using test input signals inputs to PICS.	a. Displays listed in Table 2.8.7-2 are indicated on the PICS operator workstations in the MCR. b. Displays listed in Table 2.8.7-2 are indicated on the PICS operator workstations in the RSS.
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.8.7-2.	a. Tests will be performed using controls on the PICS operator workstations in the MCR. b. Tests will be performed using controls on the PICS operator workstations in the RSS.	a. Controls on the PICS operator workstations in the MCR perform the function listed in Table 2.8.7-2. b. Controls on the PICS operator workstations in the RSS perform the function listed in Table 2.8.7-2.

3.7 Deleted.

3.8 Deleted.

3.9 Deleted.

3.10 Deleted.

3.11 The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~

3.12 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.13 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.14 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.15 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.16 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

3.17 Containment isolation valves listed in Table 3.5-3 are located close to the containment penetrations as practical with consideration of the following:

- Access for inspection of welds.
- Containment leak testing.
- Replacement.
- Valve maintenance.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 3.5-2 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR perform the function listed in Table 3.5-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 3.5-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

Table 3.5-4—Containment Isolation ITAAC
Sheet 2 of 9

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.4	Equipment identified as Seismic Category I in Table 3.5-1 can withstand seismic design basis loads without a loss of the function listed in Table 3.5-1.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment identified as Seismic Category I in Table 3.5-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 3.5-1 to verify that the equipment, including anchorage, are installed per the approved design requirements.	a. Test/analysis reports conclude that the equipment identified as Seismic Category I in Table 3.5-1 can withstand seismic design basis loads without a loss of the function listed in Table 3.5-1 including the time required to perform the listed function. b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 3.5-1, including anchorage, are installed per the approved design requirements.
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	Deleted.	Deleted.	Deleted.
3.10	Deleted.	Deleted.	Deleted.
3.11	The design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III requirements.~~Deleted.~~	An analysis will be performed to determine the maximum total stress and deformation values for each of the ASME Code, Section III, Class 2 component operating conditions.~~Deleted.~~	A stress analysis report concludes that the design and service stress limits and deformation criteria for ASME Code, Section III, Class 2 components comply with ASME Code Section III, NC-3000 requirements. The report identifies those values that differ from the allowable limits by less than 10 percent.~~Deleted.~~

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 8 of 40

Item No.	Description	Section
3.3-3	A COL applicant that references the U.S. EPR design certification will demonstrate that failure of site-specific structures or components not included in the U.S. EPR standard plant design, and not designed for tornado loads, will not affect the ability of other structures to perform their intended safety functions.	3.3.2
3.4-1	A COL applicant that references the U.S. EPR design certification will confirm the potential site specific external flooding events are bounded by the U.S. EPR design basis flood values or otherwise demonstrate that the design is acceptable.	3.4.3.2
3.4-2	A COL applicant that references the U.S. EPR design certification will perform a flooding analysis for the ultimate heat sink makeup water intake structure based on the site-specific design of the structures and the flood protection concepts provided herein.	3.4.3.10
3.4-3	A COL applicant that references the U.S. EPR design certification will define the need for a site-specific permanent dewatering system.	3.4.3.11
3.4-4	Deleted. ~~A COL applicant that references the U.S. EPR design certification will perform internal flooding analyses prior to fuel load for the Safeguard Buildings and Fuel Building to demonstrate that the impact of internal flooding is contained within the Safeguard Building or Fuel Building division of origin.~~	Deleted~~3.4.1~~
3.4-5	Deleted.~~A COL applicant that references the U.S. EPR design certification will perform an internal flooding analysis prior to fuel load for the Reactor Building and Reactor Building Annulus to demonstrate that the essential equipment required for safe shutdown is located above the internal flood level.~~	Deleted~~3.4.1~~
3.4-6	A COL applicant that references the U.S. EPR design certification will include in its maintenance program appropriate watertight door preventive maintenance in accordance with manufacturer recommendations so that each Safeguards Building and Fuel Building watertight door above elevation +0 feet remains capable of performing its intended function.	3.4.1
3.4-7	A COL applicant that references the U.S. EPR design certification will design the watertight seal between the Access Building and the adjacent Category I access path to the Reactor Building Tendon Gallery. Watertight seal design will account for hydrostatic loads, lateral earth pressure loads, and other applicable loads.	3.4.2

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 9 of 40

Item No.	Description	Section
3.5-1	A COL applicant that references the U.S. EPR design certification will describe essential elements of a program~~controls~~ to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be removed from containment prior to operation, moved to a location where it is not a potential hazard to safety-related SSC, or seismically restrained to prevent it from becoming a missile.	3.5.1.2.3
3.5-2	A COL applicant that references the U.S. EPR design certification will confirm the evaluation of the probability of turbine missile generation for the selected turbine generator, P1, is less than 1 x 10^{-54} for turbine-generators unfavorably oriented. ~~with respect to containment.~~	3.5.1.3
3.5-3	A COL applicant that references the U.S. EPR design certification will assess the effect of potential turbine missiles from turbine generators within other nearby or co-located facilities.	3.5.1.3
3.5-4	A COL applicant that references the U.S. EPR design certification will evaluate the potential for other missiles generated by natural phenomena, such as hurricanes and extreme winds, and their potential impact on the missile protection design features of the U.S. EPR.	3.5.1.4
3.5-5	A COL applicant that references the U.S. EPR design certification will evaluate the potential for site proximity explosions and missiles generated by these explosions for their potential impact on missile protection design features.	3.5.1.5
3.5-6	A COL applicant that references the U.S. EPR design certification will evaluate site-specific aircraft hazards and their potential impact on plant SSC.	3.5.1.6
3.5-7	For sites with surrounding ground elevations higher than plant grade, a COL applicant that references the U.S. EPR design certification will confirm that automobile missiles cannot be generated within a 0.5 mile radius of safety-related SSC that would lead to impact higher than 30 ft above plant grade.	3.5.1.4
3.5-8	A COL applicant that references the U.S. EPR design certification will describe controls to confirm that unsecured compressed gas cylinders will be either removed or seismically supported when not in use to prevent them from becoming missiles.	3.5.1.1.3
3.5-9	A COL applicant that references the U.S. EPR design certification will describe controls to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be either removed or seismically supported when not in use to prevent it from becoming a missile.	3.5.1.1.3
3.6-1	Deleted.	Deleted

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Item No.	Description	Section
3.6-2	Deleted.	Deleted
3.6-3	Deleted.A COL applicant that references the U.S. EPR design certification will confirm that the design LBB analysis remains bounding for each piping system and provide a summary of the results of the actual as-built plant specific LBB analysis, including material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms.	Deleted3.6.3
3.6-4	A COL applicant that references the U.S. design certification will provide diagrams showing the final as-designed configurations, locations, and orientations of the pipe whip restraints in relation to break locations in each piping system.	3.6.2.5.1
3.6-5	A COL applicant that references the U.S. EPR design certification will implement the ISI program as augmented with NRC approved ASME Code cases that are developed and approved for augmented inspections of Alloy 690/152/52 material to address PWSCC concerns.	3.6.3.3.4.1
3.7-1	A COL applicant that references the U.S. EPR design certification will confirm that the site-specific seismic response is within the parameters of section 3.7 of the U.S. EPR standard design.	3.7.2
3.7-2	A COL applicant that references the US EPR design certification will provide the site-specific separation distances for the access building and turbine building.	3.7.2.8
3.7-3	A COL applicant that references the U.S. EPR design certification will provide a description of methods used for seismic analysis of site-specific Category I concrete dams, if applicable.	3.7.3.13
3.7-4	A COL applicant that references the U.S. EPR design certification will determine whether essentially the same seismic response from a given earthquake is expected at each of the units in a multi-unit site or instrument each unit. In the event that only one unit is instrumented, annunciation shall be provided to each control room.	3.7.4.2
3.7-5	A COL applicant that references the U.S. EPR design certification will determine a location for the free-field acceleration sensor such that the effects associated with surface features, buildings, and components on the recordings of ground motion are insignificant. The acceleration sensor must be based on material representative of that upon which the Nuclear Island (NI) and other Seismic Category I structures are founded.	3.7.4.2.1
3.7-6	A COL applicant that references the US EPR design certification will provide the seismic design basis for the sources of fire protection water supply for safe plant shutdown in the event of a SSE.	3.7.2.8

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Item No.	Description	Section
3.9-2	A COL applicant that references the U.S. EPR design certification will prepare the design specifications and design reports for site specific ASME Class 1, 2, and 3 components, piping, supports and core support structures that comply with and are certified to the requirements of Section III of the ASME Code. The COL applicant will address the results and conclusions from the reactor internals material reliability programs applicable to the U.S. EPR reactor internals with regard to known aging degradation mechanisms such as irradiation-assisted stress corrosion cracking and void swelling addressed in Section 4.5.2.1.	3.9.3
3.9-3	~~A COL applicant that references the U.S. EPR design certification will examine the feedwater line welds after hot functional testing prior to fuel loading and at the first refueling outage, in accordance with NRC Bulletin 79-13. A COL applicant that references the U.S. EPR design certification will report the results of inspections to the NRC, in accordance with NRC Bulletin 79-13.~~ Deleted	~~3.9.3.1.1~~Deleted
3.9-4	As noted in ANP-10264NP-A, a COL applicant that references the U.S. EPR design certification will describe essential elements of a program to confirm that thermal deflections do not create adverse conditions during hot functional testing.	3.9.3.1.1
3.9-5	As noted in ANP-10264NP-A, should a COL applicant that references the U.S. EPR design certification find it necessary to route Class 1, 2, and 3 piping not included in the U.S. EPR design certification so that it is exposed to wind and tornadoes, the design must withstand the plant design-basis loads for this event.	3.9.3.1.1
3.9-6	A COL applicant that references the US EPR design certification will identify any additional site-specific valves in Table 3.9.6-2 to be included within the scope of the IST program.	3.9.6.3
3.9-7	A COL applicant that references the U.S. EPR design certification will submit the preservice testing (PST) program and IST program for pumps, valves, and snubbers as required by 10 CFR 50.55a.	3.9.6
3.9-8	A COL applicant that references the US EPR design certification will identify any additional site-specific pumps in Table 3.9.6-1 to be included within the scope of the IST program.	3.9.6.2
3.9-9	COL applicant that references the U.S. EPR design certification will either use a piping analysis program based on the computer codes described in Section 3.9.1 and Appendix 3C or will implement a U.S. EPR benchmark program using models specifically selected for the U.S. EPR.	3.9.1.2
3.9-10	Pipe stress and support analysis will be performed by a COL applicant that references the U.S. EPR design certification.	3.9.1.2

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Item No.	Description	Section
3.9-11	Deleted.~~A COL applicant that references the U.S. EPR design certification will provide a summary of the maximum total stress, deformation (where applicable), and cumulative usage factor values for each of the component operating conditions for ASME Code Class 1 components. For those values that differ from the allowable limits by less than 10 percent, the COL applicant will provide the contribution of each of the loading categories (e.g., seismic, pipe rupture, dead weight, pressure, and thermal) to the total stress for each maximum stress value identified in this range. The COL applicant will also provide the maximum total stress and deformation values for each operating condition for Class 2 & 3 components required for safe shutdown of the reactor, or mitigation of consequences of a postulated piping failure without offsite power. Identification of those values that differ from the allowable limits by less than 10 percent will also be provided.~~	Deleted~~3.9.3.1~~
3.9-12	A COL applicant that references the U.S.EPR design certification will provide a table identifying the safety-related systems and components that use snubbers in their support systems, including the number of snubbers, type (hydraulic or mechanical), applicable standard, and function (shock, vibration, or dual-purpose snubber). For snubbers identified as either a dual-purpose or vibration arrester type, the COL applicant shall indicate whether the snubber or component was evaluated for fatigue strength.	3.9.6.4
3.9-13	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones and applicable ASME OM Code for the preservice and inservice examination and testing programs. These programs will be consistent with the requirements in the latest edition and addenda of the OM Code incorporated by reference in 10 CFR 50.55a on the date 12 months before the date for initial fuel load.	3.9.6
3.9-14	A COL applicant that references the U.S. EPR design certification will provide a summary of reactor core support structure maximum total stress, deformation, and cumulative usage factor values for each component and each operating condition in conformance with ASME Section III Subsection NG.	3.9.5.2
3.10-1	Deleted.~~A COL applicant that references the U.S. EPR design certification will create and maintain the SQDP file during the equipment selection and procurement phase~~.	Deleted~~3.10.4~~
3.10-2	A COL applicant that references the U.S. EPR design certification will identify any additional site specific components that need to be added to the equipment list in Table 3.10-1.	3.10.1.1

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Item No.	Description	Section
3.10-3	If the seismic and dynamic qualification testing is incomplete at the time of the COL application, a COL applicant that references the U.S. EPR design certification will submit an implementation program, including milestones and completion dates, for NRC review and approval prior to installation of the applicable equipment.	3.10.4
3.11-1	Deleted.~~A COL applicant that references the U.S. EPR design certification will maintain the equipment qualification test results and qualification status file during the equipment selection, procurement phase and throughout the installed life in the plant.~~	Deleted~~3.11~~
3.11-2	A COL applicant that references the U.S. EPR design certification will identify additional site specific components that need to be added to the environmental qualification list in Table 3.11-1.	3.11.1.1.3
3.11-3	If the equipment qualification testing is incomplete at the time of the COL application, a COL applicant that references the U.S. EPR design certification will submit an implementation program, including milestones and completion dates, for NRC review and approval prior to installation of the applicable equipment.	3.11.3
3.12-1	A COL applicant that references the U.S. EPR design certification will perform a review of the impact of contributing mass of supports on the piping analysis following the final support design to confirm that the mass of the support is no more than ten percent of the mass of the adjacent pipe span. If the impact review determines the existing piping analysis does not bound the additional mass of the pipe support, the COL applicant will perform reanalysis of the piping to include the additional mass.	3.12.4.2
3.12-2	As indicated in Section 5.3 of topical report ANP-10264NP-A, pipe and support stress analysis will be performed by the COL applicant that references the U.S. EPR design certification. If the COL applicant that references the U.S. EPR design certification chooses to use a piping analysis program other than those listed in Section 5.1 of the topical report, the COL applicant will implement a benchmark program using models specifically selected for the U.S. EPR.	3.12.4.3
3.12-3	A COL applicant that references the U.S. EPR design certification will describe essential elements of a program to monitor the RHR/ SIS/ EBS injection piping from the RCS to the first isolation valve (all four trains), and RHR/SIS suction piping from the RCS to the first isolation valve (trains 1 and 4) during the first cycle of the first U.S. EPR initial plant operation to verify that operating conditions have been considered in the design unless data from a similar plant's operation demonstrates that thermal oscillation is not a concern for piping connected to the RCS.	3.12.5.9

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Item No.	Description	Section
3.12-4	A COL applicant that references the U.S. EPR design certification will describe essential elements of a program to monitor pressurizer surge line temperatures during the first fuel cycle of initial plant operation to verify that the design transients for the surge line are representative of actual plant operations.	3.12.5.10.1
3.12-5	A COL applicant that references the U.S. EPR design certification will describe essential elements of a program to monitor the normal spray line temperatures during the first cycle of the first U.S. EPR initial plant operation to verify that the design transients for the normal spray are representative of actual plan operations unless data from a similar plant's operation determines that monitoring is not warranted.	3.12.5.10.3
3.12-6	~~A COL applicant that references the U.S. EPR design certification will monitor the temperature of the main feedwater lines during the first cycle of the first U.S. EPR initial plant operation to verify that the design transients for the main feedwater lines are representative of actual plant operations unless data from a similar plant's operation determines that monitoring is not warranted.~~ Deleted	~~3.12.5.10.4~~Deleted
3.13-1	A COL applicant referencing the U.S. EPR design certification will submit the inservice inspection program for ASME Code Class 1, Class 2, and Class 3 threaded fasteners, to the NRC prior to performing the first inspection. The program will identify the applicable edition and addenda of ASME Section XI and ensure compliance with the requirements of 10CFR50.55a(b)(2)(xxvii).	3.13.2
3E-1	A COL applicant that references the U.S. EPR design certification will address critical sections relevant to site-specific Seismic Category I structures.	3E
5.2-1	Deleted	
5.2-2	A COL applicant that references the U.S. EPR design certification will identify additional ASME code cases to be used.	5.2.1.2
5.2-3	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones for the site-specific ASME Section XI preservice and inservice inspection program for the reactor coolant pressure boundary, consistent with the requirements of 10 CFR 50.55a (g). The program will identify the applicable edition and addenda of the ASME Code Section XI, and will identify additional relief requests and alternatives to Code requirements.	5.2.4
5.2-4	A COL applicant that references the U.S. EPR design certification will develop procedures in accordance with RG 1.45, Revision 1.	5.2.5.5

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Item No.	Description	Section
6.4-3	A COL applicant that references the U.S. EPR design certification will evaluate the results of the toxic chemical accidents from Section 2.2.3, address their impact on control room habitability in accordance with RG 1.78, and if necessary, identify the types of sensors and automatic control functions required for control room operator protection.	6.4.1
6.4-4	A COL applicant that references the U.S. EPR design certification will confirm that the radiation exposure of main control room occupants resulting from a design basis accident at a nearby unit on a multi-unit site is bounded by the radiation exposure from the postulated design basis accidents analyzed for the U.S. EPR; or confirm that the limits of GDC-19 are met.	6.4.4
6.6-1	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones for the site-specific ASME Section XI preservice and inservice inspection program for the Class 2 and Class 3 components, consistent with the requirements of 10 CFR 50.55a (g). The program will identify the applicable edition and addenda of the ASME Code Section XI, and will identify additional relief requests and alternatives to Code requirements.	6.6
7.1-1	Deleted.	Deleted
7.1-2	A COL applicant that references the U.S. EPR design certification will, following selection of the actual plant operating instrumentation and calculation of the instrumentation uncertainties of the operating plant parameters~~, prior to fuel load,~~ calculate the primary power calorimetric uncertainty. The calculations will be completed using an NRC acceptable method and confirm that the safety analysis primary power calorimetric uncertainty bounds the calculated values.	7.7.2.3.5
7.1-3	A COL applicant that references the U.S. EPR design certification will identify the need for any site-specific PAM variables.	7.5.2.2.1
7.1-4	A COL applicant that references the U.S. EPR design certification will establish a plan to address the site-specific implementation of the limitations and conditions identified in Section 4 of the NRC Safety Evaluation for Topical Report ANP-10272A, "Software Program Manual for TELEPERM XS Safety Systems."	7.1.1.2.2
8.1-1	A COL applicant that references the U.S. EPR design certification will provide site-specific information describing the interface between the offsite transmission system, and the nuclear unit, including switchyard interconnections.	8.1.1

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Item No.	Description	Section
8.1-2	A COL applicant that references the U.S. EPR design certification will identify site-specific loading differences that raise EDG or Class 1E battery loading, and demonstrate the electrical distribution system is adequately sized for the additional load.	8.1.3
8.2-1	A COL applicant that references the U.S. EPR design certification will provide site specific information regarding the offsite transmission system and their connections to the station SWYD.	8.2.1.1
8.2-2	A COL applicant that references the U.S. EPR design certification will provide site-specific information for the switchyard layout design.	8.2.1.2
8.2-3	A COL applicant that references the U.S. EPR design certification will provide site-specific information that identifies actions necessary to restore offsite power and use available nearby power sources when offsite power is unavailable.	8.2.2.7
8.2-4	A COL applicant that references the U.S. EPR design certification will provide a site-specific grid stability analysis.	8.2.2.4
8.2-5	A COL applicant that references the U.S. EPR design certification will provide site-specific information for the protective devices that control the switchyard breakers and other switchyard relay devices.	8.2.1.2
8.2-6	A COL applicant that references the U.S. EPR design certification will provide site-specific information for the station switchyard equipment inspection and testing plan.	8.2.2.5
8.2-7	A COL applicant that references the U.S. EPR design certification will provide site specific information regarding the communication agreements and protocols between the station and the transmission system operator, independent system operator, or reliability coordinator/authority. Additionally, the applicant will provide a description of the analysis tool used by the transmission system operator to determine, in real time, the impact that the loss or unavailability of various transmission system elements will have on the condition of the transmission system to provide post-trip voltages at the switchyard. The information provided will be consistent with information requested in NRC generic letter 2006-02.	8.2.1.1
8.2-8	A COL applicant that references the U.S. EPR design certification will provide site-specific information regarding indication and control of switchyard components.	8.2.1.2
8.3-1	A COL applicant that references the U.S. EPR design certification will establish procedures to monitor and maintain EDG reliability during plant operations to verify the selected reliability level target is being achieved as intended by RG 1.155.	8.3.1.1.5

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Item No.	Description	Section
9.5-8	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.1.8.7, Fire Modeling.	Table 9.5.1-1 C.1.8.7
9.5-9	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.5.5, Post-Fire Safe-Shutdown Procedures.	Table 9.5.1-1 C.5.5
9.5-10	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.5.5.1, Safe-Shutdown Procedures.	Table 9.5.1-1 C.5.5.1
9.5-11	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.5.5.2, Alternative/Dedicated Shutdown Procedures.	Table 9.5.1-1 C.5.5.2
9.5-12	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.5.5.3, Repair Procedures.	Table 9.5.1-1 C.5.5.3
9.5-13	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.6.2.4, Independent Spent Fuel Storage Areas.	Table 9.5.1-1, C.6.2.4
9.5-14	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.6.2.6, Cooling Towers.	Table 9.5.1-1, C.6.2.6 9.5.1.2.1
9.5-15	A COL applicant that references the U.S. EPR design certification will submit site specific information to address Regulatory Guide 1.189, Regulatory Position C.7.6, Nearby Facilities.	Table 9.5.1-1, C.7.6
9.5-16	Deleted.~~A COL applicant that references the U.S. EPR design certification will perform an as-built, post-fire Safe Shutdown Analysis, which includes final plant cable routing, fire barrier ratings, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The post-fire Safe Shutdown Analysis will demonstrate that safe shutdown performance objectives are met prior to fuel loading and will include a post-fire safe shutdown circuit analysis based on the methodology described in NEI 00-01, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis."~~	Deleted~~9.5.1.2.1~~

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Item No.	Description	Section
9.5.17	Deleted.~~A COL applicant that references the U.S. EPR design certification will evaluate the differences between the as-designed and as-built plant configuration to confirm the Fire Protection Analysis remains bounding. This evaluation will be performed prior to fuel loading and will consider the final plant cable routing, fire barrier ratings, combustible loading, ignition sources, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The applicant will describe how this as-built evaluation will be performed and documented, and how the NRC will be made aware of deviations from the FSAR, if any.~~	Deleted~~9.5.1.3~~
9.5-18	A COL applicant that references the U.S. EPR design certification will perform a supplemental Fire Protection Analysis for site-specific areas of the plant not analyzed by the FSAR.	9.5.1.3
9.5-19	A COL applicant that references the U.S. EPR design certification will provide a description and simplified Fire Protection System piping and instrumentation diagrams for site-specific systems.	9.5.1.2.1
9.5-20	A COL applicant that references the U.S. EPR design certification will describe the program used to monitor and maintain an acceptable level of quality in the fire protection system freshwater storage tanks.	9.5.1.2.1
9.5-21	A COL applicant that references the U.S. EPR design certification will provide a description of the offsite communication system that interfaces with the onsite communication system, including type of connectivity, radio frequency, normal and backup power supplies and plant security system interface.	9.5.2.1.1
9.5-22	A COL applicant that references the U.S. EPR design certification will describe the site-specific sources of acceptable fuel oil available for refilling the EDG fuel oil storage tanks within seven days, including the means of transporting and refilling the fuel storage tanks, following a design basis event to enable each diesel generator system to supply uninterrupted emergency power.	9.5.4.4
10.0-1	Deleted.	Deleted
10.2.1	Deleted.	Deleted
10.2-2	A COL applicant that references the U.S. EPR design certification will provide applicable material properties of the site-specific turbine rotor, including the method of calculating the fracture toughness properties~~, after the site-specific turbine has been procured~~.	10.2.3.1

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Item No.	Description	Section
10.2-3	A COL applicant that references the U.S. EPR design certification will provide applicable site-specific turbine disk rotor specimen test data, load-displacement data from the compact tension specimens and the fracture toughness properties after the site-specific turbine has been procured.	10.2.3.2
10.2.4	Deleted.	Deleted
10.2-5	A COL applicant that references the U.S. EPR design certification will provide the site-specific turbine rotor inservice inspection program and inspection interval consistent with the manufacturer's turbine missile analysis.	10.2.3.6
10.2-6	A COL applicant that references the U.S. EPR design certification will include ultrasonic examination of the turbine rotor welds or provide an analysis which demonstrates defects in the root of the rotor welds will not grow to critical size for the life of the rotor.	10.2.3.6
10.2-7	A COL applicant that references the U.S. EPR design certification will provide the site-specific inservice inspection program, inspection intervals, and exercise intervals consistent with the turbine manufacturer's recommendations for the main steam stop and control valves, the reheat stop and intercept valves, and the extraction non-return valves.	10.2.2.12
10.2-8	A COL applicant that references the U.S. EPR design certification will provide a reliability evaluation of the overspeed protection system, which includes the inspection, testing, and maintenance requirements needed to demonstrate reliable performance of the system.	10.2.2.9
10.3-1	A COL applicant that references the U.S. EPR design certification will identify the authority responsible for implementation and management of the secondary side water chemistry program.	10.3.5
10.3-2	A COL applicant that references the U.S. EPR design certification will describe essential elements ofdevelop and implement a FAC condition monitoring program that is consistent with Generic Letter 89-08 and NSAC-202L-R3 for the carbon steel portions of the steam and power conversion systems that contain water or wet steam prior to initial fuel loading.	10.3.6.3
10.4-1	A COL applicant that references the U.S. EPR design certification will describe the site-specific main condenser materials.	10.4.1.2
10.4-2	A COL applicant that references the U.S. EPR design certification will describe the site-specific design pressure and test pressure for the main condenser.	10.4.1.2

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Item No.	Description	Section
15.0-1	A COL applicant that references the U.S. EPR design certification will provide for staff review~~, prior to the first cycle of operation,~~ a report that demonstrates compliance with the following items applicable to the first cycle of operation: ● Examine fuel assembly characteristics to verify that they are hydraulically compatible based on the criterion that a single package of assembly specific critical heat flux (CHF) correlations can be used to evaluate the assembly performance. ● Verify that uncertainties used in the setpoint analyses are appropriate for the plant and cycle being analyzed. ● Verify that the DNBR and LPD satisfy SAFDL with a 95/95 assurance. ● Review the U.S. EPR FSAR Tier 2 analysis results for the first cycle to confirm that the static setpoint value provides adequate protection for at least three limiting AOO.	15.0.0.3.9
16.0-1	Reviewer's Notes and brackets are used to identify information or characteristics that are plant specific or are based on preliminary design information. A COL applicant that references the U.S. EPR design certification will provide the necessary information in response to the Reviewer's Notes and replace preliminary information provided in brackets of the Technical Specifications and Technical Specification Bases with plant specific values.	16.0
17.2-1	A COL applicant that references the U.S. EPR design certification will provide the Quality Assurance Programs associated with the construction and operations phases.	17.2
17.4-1	A COL applicant that references the U.S. EPR design certification will identify the site-specific SSC within the scope of the RAP.	17.4.2
17.4-2	A COL applicant that references the U.S. EPR design certification will provide the information requested in Regulatory Guide 1.206, Section C.I.17.4.4.	17.4.4
17.6-1	A COL applicant that references the U.S. EPR design certification will describe the process for determining which plant structures, systems, and components (SSC) will be included in the scope of the Maintenance Rule Program in accordance with 10 CFR 50.65(b). The program description will identify that additional SSC functions may be added to or subtracted from the Maintenance Rule scope prior to fuel load, when additional information is developed (e.g., emergency operating procedures, or EOP), and after the license is issued.	17.6.1

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Item No.	Description	Section
17.6-2	A COL applicant that references the U.S. EPR design certification will provide the process for determining which SSC within the scope of the Maintenance Rule program will be tracked to demonstrate effective control of their performance or condition in accordance with 10 CFR 50.65(a)(2).	17.6.2
17.6-3	A COL applicant that references the U.S. EPR design certification will provide a program description for monitoring SSC in accordance with 10 CFR 50.65(a)(1).	17.6.2
17.6-4	A COL applicant that references the U.S. EPR design certification will identify and describe the program for periodic evaluation of the Maintenance Rule program in accordance with 10 CFR 50.65(a)(3).	17.6.3
17.6-5	A COL applicant that references the U.S. EPR design certification will describe the program for maintenance risk assessment and management in accordance with 10 CFR 50.65(a)(4). Since the removal of multiple SSC from service can lead to a loss of Maintenance Rule functions, the program description will address how removing SSC from service will be evaluated. For qualitative risk assessments, the program description will explain how the risk assessment and management program will preserve plant-specific key safety functions.	17.6.4
17.6-6	A COL applicant that references the U.S. EPR design certification will describe the program for selection, training, and qualification of personnel with Maintenance-Rule-related responsibilities consistent with the provisions of Section 13.2 as applicable. Training will be commensurate with maintenance rule responsibilities, including Maintenance Rule Program administration, the expert panel process, operations, engineering, maintenance, licensing, and plant management.	17.6.5
17.6-7	A COL applicant that references the U.S. EPR design certification will describe the relationship and interface between Maintenance Rule Program and the Reliability Assurance Program.	17.6.6
17.6-8	A COL applicant that references the U.S. EPR design certification will describe the plan or process for implementing the Maintenance Rule Program as described in the COL application, which includes establishing program elements through sequence and milestones and monitoring or tracking the performance and/or condition of SSC as they become operational. ~~The Maintenance Rule Program will be implemented by the time that fuel load is authorized.~~	17.6.8
17.6-9	A COL applicant that references the U.S. EPR design certification will describe the program for Maintenance Rule implementation.	17.6

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Item No.	Description	Section
18.1-1	A COL applicant that references the U.S. EPR design certification will execute the NRC approved HFE program as described in this section.	18.1
18.1-2	A COL applicant that references the U.S. EPR design certification will be responsible for HFE design implementation for a new Emergency Operations Facility (EOF) or changes resulting from the addition of the U.S. EPR to an existing EOF.	18.1.1.3
18.5-1	A COL applicant that references the U.S. EPR design will confirm that actual staffing levels and qualifications of plant personnel specified in Section 13.1 of the COL application remain bounded by regulatory requirements and results of the staffing and qualifications analysis.	18.5
18.8-1	A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development program for site procedures.	18.8
18.9-1	A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development of training program scope, structure, and methodology.	18.9
19.0-1	A COL applicant that references the U.S. EPR design certification will either confirm that the PRA in the design certification bounds the site-specific design information and any design changes or departures, or update the PRA to reflect the site-specific design information and any design changes or departures.	19.0
19.1-1	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of licensee programs and identify and describe risk-informed applications being implemented during the combined license application phase.	19.1.1.2
19.1-2	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of licensee programs and identify and describe risk-informed applications being implemented during the construction phase.	19.1.1.3
19.1-3	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of licensee programs and identify and describe any risk-informed applications being implemented during the operational phase.	19.1.1.4
19.1-4	A COL applicant that references the U.S. EPR design certification will conduct a peer review of the PRA relative to the ASME PRA Standard prior to use of the PRA to support risk-informed applications ~~or before fuel load~~.	19.1.2.3

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
19.1-5	A COL applicant that references the U.S. EPR design certification will describe the applicant's PRA maintenance and upgrade program.	19.1.2.4.1
19.1-6	A COL applicant that references the U.S. EPR design certification will confirm that the U.S. EPR PRA-based seismic margin assessment is bounding for their specific site, and will update it to include site-specific SSC and soil effects (including sliding, overturning liquefaction and slope failure).	19.1.5.1.2.4
19.1-7	A COL applicant that references the U.S. EPR design certification will perform the site-specific screening analysis and the site-specific risk analysis for external events applicable to their site.	19.1.5.4
19.1-8	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of site-specific design programs and processes during the design phase.	19.1.1.1
19.1-9	A COL applicant that references the U.S. EPR design certification will describe the process to review as-designed and as-built information and conduct walk-downs as necessary to confirm that the assumptions used in the PRA (including PRA inputs to RAP and SAMDA) remain valid with respect to internal events, internal flood and fire events (routings and locations of pipe, cable and conduit), and HRA analyses (development of operating procedures, emergency operating procedures and severe accident management guidelines and training), external events including PRA-based seismic margins HCLPF fragilities, and LPSD procedures.	19.1.2.2
19.2-1	A COL applicant that references the U.S. EPR design certification will develop and implement severe accident management guidelines ~~prior to fuel loading~~ using the Operating Strategies for Severe Accidents (OSSA) methodology described in U.S. EPR FSAR Section 19.2.5.	19.2.5

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contained within the division of hazard origin and are not allowed to propagate to other divisions. Consequently, in a large internal flooding event in buildings with divisional separation safety-related SSC within the affected division are assumed to be flooded. The plant arrangement provides divisional separation walls to physically separate the redundant trains of safe shutdown systems and components. A combination of fluid diversion flow paths and passive features contain the water within the affected division. Features credited in the analysis will be verified by walk-down.

Division walls below elevation +0 feet, 0 inches (hereinafter +0 feet) provide separation and serve as flood barriers to prevent flood waters spreading to adjacent divisions. These division walls are watertight, have no doors, and a minimal number of penetrations all of which are watertight up to elevation +0 feet. Water is directed within one division to the building elevations below +0 feet, where it is stored. Above elevation +0 feet, a combination of watertight doors and openings for water flow to the lower building levels prevent water ingress into adjacent divisions. Watertight doors have position indicators for control of the closed position and are periodically inspected and maintained so that they remain capable of performing their intended function. Existing openings (e.g., stair cases, elevator shafts, and equipment openings) are credited as water flow paths. Watertight doors are designed to functional requirements such as leak-rate limits, door-closure indication, door-seal aging-degradation characteristics, and maintainability. Maintenance requirements are based on manufacturer recommendations and maintenance procedures are written by COL applicants in accordance with their respective regulatory approved maintenance programs.

A COL applicant that references the U.S. EPR design certification will include in its maintenance program appropriate watertight door preventive maintenance in accordance with manufacturer recommendations so that each Safeguards Building and Fuel Building watertight door above elevation +0 feet remains capable of performing its intended function.

Flooding pits with burst openings collect and direct water flow to lower building levels. Rooms within divisions have interconnections so that the maximum released water volume can be distributed and stored in the lower building levels of the affected division. Interconnections include doors with flaps, wall openings, and other wall penetrations that are not required to be sealed. Elevated thresholds, curbs, and pedestals are provided as necessary.

In Seismic Category I buildings that are not designed with divisional separation, e.g., the Reactor Building (RB), the layout allows water released inside the building to flow to the lower level of the building. In containment, water flows down to the in-containment refueling water storage tank (IRWST). In the annulus, water flows to the bottom level where it is stored. Safety-related SSC in these buildings, required to achieve safe shutdown or mitigate the consequences of an accident, are located above the maximum water level, protecting them from the effects of flooding. Locations of safety-related SSC required for safe shutdown or to mitigate the consequences of an accident and features provided to withstand flooding will be verified by walk-down.

Leak detection and isolation measures mitigate the consequences of postulated pipe ruptures. Water level instrumentation and other leak detection measures detect pipe ruptures that could result in internal flooding. These leak detection systems provide a signal to automatically isolate the affected system or to provide indication to the main control room (MCR) to initiate operator action from within the MCR or locally. Section 3.6 provides further information on protection mechanisms associated with the postulated rupture of piping.

The nuclear island drain and vent system (NIDVS) prevents backflow of water from affected areas of the plant that contain safety-related equipment. The NIDVS is conservatively considered not available for reducing water volume by the respective sump pumps, and floor drains are assumed to be plugged.

~~A COL applicant that references the U.S. EPR design certification will perform internal flooding analyses prior to fuel load for the Safeguard Buildings and Fuel Building to demonstrate that the impact of internal flooding is contained within the Safeguard Building or Fuel Building division of origin. Features credited in the analysis will be verified by walk-down.~~

~~A COL applicant that references the U.S. EPR design certification will perform an internal flooding analysis prior to fuel load for the Reactor Building and Reactor Building Annulus to demonstrate that the essential equipment required for safe shutdown is located above the internal flood level. Locations of essential SSC and features provided to withstand flooding will be verified by walk-down.~~

3.4.2 External Flood Protection

The Seismic Category I SSC listed in Section 3.2 can withstand the effects of external flooding due to natural phenomena and postulated component failures. Seismic Category I structures, provide protection from external floods and groundwater by incorporating the following external flood protection measures:

- The PMF elevation of the U.S. EPR generic design is one foot below finished yard grade (as noted in Section 2.4).
- The maximum groundwater elevation for the U.S. EPR generic design is 3.3 ft below finished yard grade (as noted in Section 2.4).
- The finished yard grade slopes away from Seismic Category I structures so that external flood water flows away from these structures.

Therefore, SSC inside containment are designed to withstand a postulated CRDM missile, even though this event is deemed non-credible.

A COL applicant that references the U.S. EPR design certification will describe essential elements of a program controls to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be removed from containment prior to operation, moved to a location where it is not a potential hazard to safety-related SSC, or seismically restrained to prevent it from becoming a missile.

3.5.1.3 Turbine Missiles

The turbineplant layout, as shown in Figure 1.2-371 in Section 1.2, is a longitudinal arrangement for the turbine generators. The axis of the turbine rotor shafts is positioned such that safety-related structures, except for two of the four ESWBs and two EPGBs, are located outside the turbine low-trajectory hazard zone, as defined by RG 1.115. Redundant safety systems are physically separated into four divisions (one in each ESWB). Only two of the ESWBs are considered "essential systems" requiring protection from turbine missiles (as defined by RG 1.115) to perform the necessary functions to safely shut down the plant.Redundancy of the UHS and ESW systems and the EDGs provides adequate protection for U.S. EPR safety-related systems. Therefore, the turbine generator is favorably positioned, as defined by NUREG-0800 (Reference 10) SRP Section 3.5.1.3, because the containment and most of the safety-related SSC are located outside the low-trajectory hazard zone defined by RG 1.115.

Section 10.2 describes the design of the turbine generator. The probability of turbine failure resulting in ejection of the turbine rotor (or internal structure) fragments through the turbine casing, P_1, will be less than 1 x 10^{-4}. In accordance with guidance provided by Reference 10, SRP Section 3.5.1.3, Table 3.5.1.3-1, an overall turbine missile safety objective for the probability of unacceptable damage resulting from turbine missiles, P_4, of less than 1 x 10^{-7} is satisfied with P_1 less than 1 x 10^{-4} for favorably oriented turbine-generators. Therefore, given the redundancy and the low probability of a turbine missile being generated, the impact of turbine-generated missiles on safety-related SSC is not safety significant. A COL applicant that references the U.S. EPR design certification will confirm the evaluation of the probability of turbine missile generation for the selected turbine generator, P_1, is less than 1 x 10^{-4} for turbine-generators favorably oriented with respect to containment.

Section 10.2 describes requirements for disk and rotor integrity, rotor material fracture toughness, overspeed protection, inspection, testing, examination, startup procedures, operation procedures, and maintenance of the turbine generator equipment. A COL applicant that references the U.S. EPR design certification will assess the effect of potential turbine missiles from turbine generators within other nearby or co-located facilities.

S_y = yield stress of the pipe.

Using one of the above methods, the whipping pipe problem is characterized to determine the appropriate pipe movements, pipe impact loads, and pipe whip restraint design forces.

3.6.2.5 Implementation of Criteria Dealing with Special Features

3.6.2.5.1 Pipe Whip Restraints

The pipe whip restraints are a gapped, crushable, bumper-type support near an elbow and provide clearance to access welds. Additional information on the crushable material is described in Section 3.6.2.3. The restraint consists of a structural member and a bracket mounted to the structural member, with clearance around the subject piping to allow for thermal movement and the installation of pipe insulation. A COL applicant that references the U.S. design certification will provide diagrams showing the ~~final as-designed~~ configurations, locations, and orientations of the pipe whip restraints in relation to break locations in each piping system.

3.6.2.5.1.1 Location of Whip Restraints

The ideal location for a pipe whip restraint is near the first elbow upstream of the circumferential break location (or near the longitudinal break location), as close to the first elbow (or longitudinal break) as practical. This location prevents the whipping motion, while preventing a plastic hinge from developing in the pipe between the elbow and the restraint. If the placement cannot be close to the elbow (or longitudinal break) due to physical constraints, a potential hinge location is calculated using a simplified static analysis approach so that the whip restraint is properly placed. Pipe whip restraints are located so that they do not cover piping welds that require inservice inspections.

With the pipe break jets and whips characterized per the sections above, there is still a need to design pipe whip restraints which have been assumed in the rupture analysis, or to design structural barriers between the break and potential essential system targets. Both of these types of structural designs are for essential system protection purposes.

3.6.2.5.1.2 Pipe Whip Support Design

Pipe whip supports are typically only designed for the restraint of a whipping pipe following a postulated high-energy line break, and are typically separate from the other system pipe supports which are designed for other design basis loadings. Whip restraints are typically designed for a one-time accident event; so they are designed to undergo deformation as long as the whipping pipe is fully restrained for the entire time of the blowdown event. Similarly, the whip restraint has gaps to allow for the

3.6.3 Leak-Before-Break Evaluation Procedures

This section describes the analyses used to eliminate from the design basis the dynamic effects of certain pipe ruptures for high-energy piping systems and demonstrate that the probability of pipe rupture is extremely low under conditions consistent with the design basis for the piping.

GDC 4 requires structures, systems, and components important to safety to be designed to accommodate the effects from loss-of-coolant accidents. However, dynamic effects associated with postulated pipe ruptures may be excluded from the design basis when analyses reviewed and approved by the NRC demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping. Accordingly, this section addresses the piping systems that are qualified to be considered for the leak-before-break (LBB) application, the potential for piping failure mechanisms, the fracture mechanics analyses of postulated pipe cracks, and the leak detection system capability, which collectively demonstrate that the probability of pipe rupture is extremely low. This section also provides a description of the applicable piping and the analysis techniques used to eliminate from the structural design basis for the identified piping systems the dynamic effects of double-ended guillotine and equivalent longitudinal breaks.

A design report ~~COL applicant that references the U.S. EPR design certification~~ will confirm that the design LBB analysis remains bounding for each piping system and provide a summary of the results of the actual as-built, plant-specific LBB analysis, including material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms. The results of the bounding analyses are provided in the form of LBB allowable range of loadings or “LBB allowable load window.”

3.6.3.1 Application of Leak-Before-Break to the U.S. EPR

The application of LBB is limited to the following high energy piping systems:

- Main coolant loop (MCL) piping, (hot legs, crossover legs, and cold legs).
- Pressurizer surge line (SL).
- Main steam line (MSL) piping inside the containment (i.e., from the steam generators to the first anchor point location at the Containment Building penetration).

3.6.3.2 Methods and Criteria

The methods and criteria to evaluate LBB are consistent with the guidance in NUREG-1061, Volume 3 (Reference 1), and the Standard Review Plan (SRP) 3.6.3 (Reference 2) components are designed to have an extremely low probability of abnormal leakage, rapidly propagating failure, and gross rupture.

This section refers to U.S. EPR Piping Analysis and Pipe Support Design Topical Report (References 2 and 7) for information related to the design and analysis of safety-related piping. This topical report presents the U.S. EPR code requirements, acceptance criteria, analysis methods, and modeling techniques for ASME Class 1, 2, and 3 piping and pipe supports. Applicable COL action items in the topical report are identified in the applicable portions of this section. The U.S. EPR design is based on the 2004 ASME Code, Section III, Division 1, with no addenda subject to the limitations and modification identified in 10 CFR 50.55a(b)(1) and the piping analysis criteria and methods, modeling techniques, and pipe support criteria described in References 2 and 7.

A design specification is required by Section III of the ASME Code for Class 1, 2, and 3 components, piping, supports, and core support structures. In addition, the ASME Code requires design reports for all Class 1, 2, and 3 components, piping, supports and core support structures documenting that the as-designed and as-built configurations adhere to the requirements of the design specification. A COL applicant that references the U.S. EPR design certification will prepare the design specifications and design reports for site specific ASME Class 1, 2, and 3 components, piping, supports and core support structures that comply with and are certified to the requirements of Section III of the ASME Code. The COL applicant will address the results and conclusions from the reactor internals material reliability programs applicable to the U.S. EPR reactor internals with regard to known aging degradation mechanisms such as irradiation-assisted stress corrosion cracking and void swelling addressed in Section 4.5.2.1.

Other sections that relate to this section are described below:

- Section 3.9.6 describes the snubber inspection and test program.
- Section 3.10 describes the methods and criteria for seismic qualification testing of Seismic Category I mechanical equipment and a description of their seismic operability criteria.
- Section 3.12 describes the design of systems and components that interface with the RCS with regard to intersystem LOCAs.
- Section 3.13 describes bolting and threaded fastener adequacy and integrity.
- Section 5.2.2 describes the pressure-relieving capacity of the valves specified for RCPB.
- Section 10.3 describes the pressure-relieving capacity of the valves specified for the steam and feedwater systems.

3.9.3.1 Loading Combinations, System Operating Transients, and Stress Limits

Section 3.9.3.1.1 describes the design and service level loadings used for the design of ASME Class 1, 2, and 3 components, piping, supports, and core support structures, including the appropriate system operating transients. Sections 3.9.3.1.2 through 3.9.3.1.8 define the loading combinations for the ASME Code Class 1, 2, and 3 components, piping, supports, and core support structures; these sections also define the stress limits applicable to the various load combinations. The loading combinations and corresponding stress limits for ASME Code design are defined for the Design Condition, Service Levels A, B, C and D (also known as normal, upset, emergency, and faulted conditions), and test conditions.

Internal parts of components, such as valve discs, seats, and pump shafts, comply with the applicable ASME Code or Code Case criteria. In those instances where no ASME Code criteria exist, these components are designed so that no safety-related functions are impaired.

Calculation methods used to evaluate RCS components and their supports for faulted loading are provided in Appendix 3C. Calculation methods used to evaluate piping and supports are described in Sections 4 and 6 of Reference 2.

~~A COL applicant that references the U.S. EPR design certification will~~ Stress analysis reports provide a summary of the maximum total stress, deformation (where applicable), and cumulative usage factor values for each of the component operating conditions for ASME Code Class 1 components. For those values that differ from the allowable limits by less than 10 percent, stress analysis reports~~the COL applicant will~~ provide the contribution of each of the loading categories (e.g., seismic, pipe rupture, dead weight, pressure, and thermal) to the total stress for each maximum stress value identified in this range.

Stress analysis reports~~The COL applicant will~~ also provide the maximum total stress and deformation values (where applicable) for each operating condition for Class 2 & 3 components required for safe shutdown of the reactor, or mitigation of consequences of a postulated piping failure without offsite power. Identification of those values that differ from the allowable limits by less than 10 percent will also be provided.

3.9.3.1.1 Loads for Components, Component Supports, and Core Support Structures

The following sections describe the loadings considered in the design of the components, piping, and support structures. Piping analysis methods are described in Appendix 3C and the Piping Analysis Topical Report (Reference 2). Section 3.9.1 lists the design transients and number of events used in fatigue analyses.

Thermal Stratification, Cycling, and Striping

Thermal stratification, cycling, and striping (including applicable NRC Bulletins 79-13, 88-08, and 88-11) are described in Section 3.7 of Reference 2. The pressurizer surge line is analyzed with the main coolant loop piping and supports as described in Appendix 3C. As noted in ANP-10264NP-A, a COL applicant that references the U.S. EPR design certification will describe essential elements of a program to confirm that thermal deflections do not create adverse conditions during hot functional testing.

~~A COL applicant that references the U.S. EPR design certification will examine the feedwater line welds after hot functional testing prior to fuel loading and at the first refueling outage, in accordance with NRC Bulletin 79-13. A COL applicant that references the U.S. EPR design certification will report the results of inspections to the NRC, in accordance with NRC Bulletin 79-13.~~ Inspection of the feedwater line welds, in accordance with NRC Bulletin 79-13, is performed as part of the initial test program (Section 14.2.12.3.10). Additional information on feedwater line stratification is provided in Section 3.12.5.10.4.

Environmental Fatigue

The effects of the environment on fatigue for Class 1 piping and components are addressed in FSAR Section 3.12 and in Section 3.4 of Reference 2.

3.9.3.1.2 Load Combinations and Stress Limits for Class 1 Components

Table 3.9.3-1—Load Combinations and Acceptance Criteria for ASME Class 1 Components provides the loading combinations and corresponding stress design criteria per ASME Service Level for ASME Class 1 components.

3.9.3.1.3 Load Combinations and Stress Limits for Class 2 and 3 Components

Table 3.9.3-2—Load Combinations and Acceptance Criteria for ASME Class 2 and 3 Components provides the loading combinations and corresponding stress design criteria per ASME Service Level for ASME Class 2 and 3 components.

3.9.3.1.4 Load Combinations and Stress Limits for Class 1 Piping

Table 3-1 of Reference 2 provides the loading combinations and corresponding stress design criteria per ASME Service Level for ASME Class 1 piping.

3.9.3.1.5 Load Combinations and Stress Limits for Class 2 and 3 Piping

Table 3-2 of Reference 2 provides the loading combinations and corresponding stress design criteria per ASME Service Level for ASME Class 2 and 3 piping.

described above. The Test Response Spectra (TRS) closely resembles and envelops the RRS.

Equipment functionality adequacy will be demonstrated by testing. The equipment support will be included in the test using the representative ISRS input motion at the equipment support mounting location. If the equipment is installed in a non-operational mode for the support testing, the response in the test at the equipment mounting locations should be monitored and characterized in a manner consistent with SRP 3.10, Acceptance Criteria (II) (1) (A) (iii). In such a case, equipment should be tested separately for functionality, and the actual input motion to the equipment in this test should be more conservative in amplitude and frequency content than the monitored response from the support test.

The seismic qualification of equipment requires consideration of actual or installed equipment mounting. The mounting conditions and methods for the tested or analyzed equipment simulate the expected or installed conditions. The equipment mounting considered in the analysis or testing is identified in the SQDP.

3.10.4 Test and Analysis Results and Experience Database

The results of seismic qualification testing and analysis, per the criteria in Section 3.10.1, Section 3.10.2, Section 3.10.3, are included in the corresponding SQDP (see Appendix 3D, Attachment F). ~~A COL applicant that references the U.S. EPR design certification will create and maintain the~~ SQDP files are created and maintained during the equipment selection and procurement phase. If the seismic and dynamic qualification testing is incomplete at the time of the COL application, a COL applicant that references the U.S. EPR design certification will submit an implementation program, including milestones and completion dates, for NRC review and approval prior to installation of the applicable equipment.

Complete and auditable plant-specific records and reports are available and are maintained at a central location for the life of the plant. The reports describe the qualification methods used for the equipment in sufficient detail to document compliance with the specified criteria. These records are updated and maintained current as equipment is replaced, modified, further tested, or requalified.

The equipment seismic qualification file contains a list of the systems' equipment and the equipment support structures. The equipment list identifies which equipment is NSSS supplied and which equipment is balance-of-plant supplied. The equipment qualification file includes qualification summary data sheets for each mechanical and electrical component of each system which summarizes the component's qualification. See Appendix 3D, Attachment F for a sample SQDP and Appendix 3D, Attachment A for a sample equipment qualification data package.

The seismic qualification of mechanical and electrical equipment is presented in Section 3.10. The portions of post-accident monitoring equipment required to be environmentally qualified are discussed in Section 3.11.2.1.

~~A COL applicant that references the U.S. EPR design certification will maintain t~~The equipment qualification test results and qualification status file are maintained during the equipment selection, procurement phase and throughout the installed life in the plant.

3.11.1 Equipment Identification and Environmental Conditions

Mechanical and electrical equipment covered by this section includes equipment associated with systems that are essential to emergency reactor shutdown, containment isolation, core cooling, and containment and reactor heat removal, or are otherwise essential to preventing significant release of radioactive material to the environment.

Included in this equipment scope is:

- Equipment that performs these functions automatically.
- Equipment that is used by the operators to perform these functions manually.
- Equipment whose failure can prevent the satisfactory accomplishment of one or more of the above safety functions.
- Safety-related and important to safety electrical equipment (including I&C) as described in 10 CFR 50.49 (b)(1) and (b)(2).
- Certain post-accident monitoring (PAM) equipment as described in 10 CFR 50.49(b)(3).

3.11.1.1 Equipment Identification

The list of components to be screened for qualification has been developed with consideration of systems, structures and components (SSC) located in three plant areas: the Nuclear Island (NI), Turbine Island (TI), and the balance of plant (BOP).

3.11.1.1.1 Nuclear Island

The NI consists of the following structures:

- Reactor Building (RB).
- Safeguards Buildings (SB).
- Fuel Building.

This conclusion is based on turbulent or vortex penetration, which is considered a fundamental mechanism for thermal cycling in DH oriented piping, according to Reference 3. Operating plant experiences presented in Reference 3 support this finding and indicate that DH piping does not require valve leakage for thermal cycling to occur, but instead thermal stratification in DH lines was governed by the cyclic penetration and retreat of the thermal front due to turbulent penetration. The U.S. EPR design incorporates lessons learned from this operating experience in that the injection line (SIS/RHRS) continually rises in elevation from the check valve; therefore, it is not susceptible to valve leakage-induced cyclic thermal stratification.

A COL applicant that references the U.S. EPR design certification will describe essential elements of a program to monitor the RHR/SIS/EBS injection piping from the RCS to the first isolation valve (all four trains) and RHR/SIS suction piping from the RCS to the first isolation valve (trains 1 and 4) during the first cycle of the first U.S. EPR initial plant operation to verify that operating conditions have been considered in the design unless data from a similar plant's operation demonstrates that thermal oscillation is not a concern for piping connected to the RCS.

3.12.5.10 Thermal Stratification

The term "thermal stratification" applies to any condition where fluid is thermally layered due to buoyancy differences between the layers. Thermal stratification occurs in horizontal piping when flow and boundary conditions result in two layers of fluid at different temperatures without appreciable mixing. In cases where the top of pipe temperature is higher than the bottom of pipe temperature, pipe stresses occur due to pipe deflection and changes in support loads.

3.12.5.10.1 Pressurizer Surge Line Stratification (NRC Bulletin 88-11)

NRC Bulletin 88-11 recommended that pressurized water reactors (PWR) establish and implement a program to verify the structural integrity of the pressurizer surge line when subjected to thermal stratification.

The U.S. EPR design addresses the concerns of NRC Bulletin 88-11 with several features and operational procedures that minimize surge line stratification:

- The pressurizer surge line piping layout minimizes stratification. The pressurizer surge line has a continuous centerline elevation decrease from the pressurizer to the hot leg. Also, the pressurizer surge line connects to the top of the hot leg with a vertical take-off. The surge line is sloped at approximately five degrees between the vertical take-off at the hot leg and the vertical leg at the pressurizer which promotes mixing of the colder and hotter fluid layered in the line. There are no horizontal sections of pressurizer surge line piping.

- The take-off from the hot leg is upward vertical and of sufficient length such that when coupled with continuous bypass spray flow it will prevent the cooler hot leg fluid from entering the surge line beyond the take-off.
- During normal at-power operation, a continuous bypass spray flow of sufficient magnitude is maintained to further suppress turbulent penetration from the hot leg flow.
- The pressurizer versus RCS temperature differential is controlled during heatup to limit the pressurizer-to-hot leg temperature difference. Also, the pressurizer on/off heaters are energized during initial RCS heatup to maintain a constant outsurge of fluid from the pressurizer reducing the number of insurges and the thermal cycles between pressurizer and hot leg temperature.

A COL applicant that references the U.S. EPR design certification will describe essential elements of a program to monitor pressurizer surge line temperatures during the first fuel cycle of initial plant operation to verify that the design transients for the surge line are representative of actual plant operations. The monitoring program includes temperature measurements at several locations along the pressurizer surge line and plant parameters including pressurizer temperature, pressurizer level, hot leg temperature, and reactor coolant pump status.

3.12.5.10.2 Pressurizer Stratification

Insurges due to momentary fluctuations in RCS inventory occur during normal operation. These fluctuations result in a stratified thermal front of cooler fluid (near hot leg temperature) being moved up into the lower section of the pressurizer. These insurges result in a step change in the pressurizer bottom fluid temperature. Consideration of these temperature changes is included in the design basis of the pressurizer.

3.12.5.10.3 Spray Line Stratification

The normal spray lines contain stratified liquid and steam during the initial part of the heatup as the horizontal sections in each of the two lines are filled from the cold leg at the same time that the pressurizer is being filled. A COL applicant that references the U.S. EPR design certification will describe essential elements of a program to monitor the normal spray line temperatures during the first cycle of the first U.S. EPR initial plant operation to verify that the design transients for the normal spray are representative of actual plant operations unless data from a similar plant's operation determines that monitoring is not warranted.

The auxiliary spray line is not used during normal or upset operations. The potential for stratification exists only during initiation for emergency and faulted transients where auxiliary spray is used.

corresponding pressures and/or temperatures. The continuous secondary calorimetric calculation of reactor thermal power is performed according to methodology outlined in Reference 3, which has been accepted by the NRC, per Reference 4. As an analytical requirement, 0.48 percent uncertainty on core thermal power was assumed in the safety analysis. However, the measurement requirements for the U.S. EPR allow the secondary side calorimetric to calculate reactor thermal power within a ± 0.40 percent uncertainty. To achieve the required uncertainty in the secondary side calorimetric algorithm, the elemental uncertainties of the instrument strings and parameters, previously mentioned, are verified to comply with requirements provided in Table 7.7-2—Elemental Uncertainties for Secondary Side Calorimetric.

The control logic compares the mismatch between main turbine and generator load and the highest of the previously listed power signals and takes actions when reactor power exceeds 100 percent. There are two thresholds. The intent of the first is to alert the operator and take action to prevent further power increase. The intent of the second threshold is to reduce power to 100 percent.

A COL applicant that references the U.S. EPR design certification will, following selection of the actual plant operating instrumentation and calculation of the instrumentation uncertainties of the operating plant parameters, ~~prior to fuel load,~~ calculate the primary power calorimetric uncertainty. The calculations will be completed using an NRC acceptable method and confirm that the safety analysis primary power calorimetric uncertainty bounds the calculated values.

7.7.2.3.6 Rod Drop Limitation

The objective of this limitation function is to detect the spurious drop of RCCAs and to reduce the turbine generator power level to match the reactor power reduction due to the dropped RCCAs.

This limitation function is designed to avoid reactivity compensation by core control functions after the RCCAs drop and to avoid the low departure from nucleate boiling (DNBR) and high linear power density (HLPD) protective actuations after one or more RCCAs drop into the core.

Rod drop is detected in the RCSL system based on the RCCA position measurements. In each RCSL division, a quarter of the RCCAs are monitored and the four RCCA drop detection logic signals (i.e., one per RCSL division) are voted one out of four.

The other criterion indicating an RCCA drop is derived from the decrease of the reactor power level (i.e., neutron flux from power range detectors). The derivative of the four nuclear power signals are compared with a low threshold and voted one out of four.

The load acceptance test demonstrates the ability of the load sequencer to properly sequence loads listed in Table 8.3-4, Table 8.3-5, Table 8.3-6 and Table 8.3-7 onto the EDGs within the specified time, while the EDG maintains and restores voltage and frequency within specifications.

Load tests are performed to verify an EDG output of 9500 kW or greater while maintaining steady-state frequency at 60 Hz ± 2 percent and steady-state output voltage between 6555 VAC and 7260 VAC. The EDG continuous rating is sufficient to supply the safety-related and non-safety-related loads assigned to each EDG per Table 8.3-4, Table 8.3-5, Table 8.3-6 and Table 8.3-7 for the respective EDG when derated for ambient air temperatures and essential service water temperatures. Additionally, periodic load tests are performed at a load of 105-110 percent to demonstrate capability to operate at the short term rating of 110 percent for a period of two hours.

Emergency Diesel Generator Reliability Program

EDG minimum reliability targets are described in Section 8.4.2.6.1. A COL applicant that references the U.S. EPR design certification will establish procedures to monitor and maintain EDG reliability during plant operations to verify the selected reliability level target is being achieved as intended by RG 1.155. Surveillance testing of the EDGs is in accordance with the availability testing described in RG 1.9, and is detailed in Chapter 16.

The EDGs are procured from a diesel generator manufacturer which meets the requirements of RG 1.9 and considers the recommendations of NUREG/CR-0660 (Reference 9). Specific included design recommendations of Reference 9 are:

- The starting air system air dryer minimizes moisture, as described in Section 9.5.6.2.2.
- The lube oil preheat system performs a non-safety-related function to continuously maintain the lube oil at a set temperature using a preheating unit when the diesel generator is in standby. A motor-driven pump circulates the lube oil through the engine and the standby heater unit to maintain the engine in a prelubricated condition to reduce wear during engine starts.
- The EPGB ventilation system includes particulate air filters in addition to maintaining the building at a positive pressure which limits dust and other contaminates entering the building.
- Combustion air and ventilation system intakes are a minimum of 20 ft above adjacent ground elevation. Diesel engine exhaust gases are released from the exhaust stack on the building roof on the opposite side of the building from the ventilation and combustion air intakes that are located on the building side.

The diverse design of the U.S. EPR plant makes sure that systems and equipment are available to accomplish the previously listed performance goals.

The A COL applicant that references the U.S. EPR design certification will perform an as-built, post-fire Safe Shutdown Analysis, which includes final plant cable routing, fire barrier ratings, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The post-fire Safe Shutdown Analysis will demonstrates that safe shutdown performance objectives are met prior to fuel loading and will includes a post-fire safe shutdown circuit analysis based on the methodology described in NEI 00-01, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis" (Reference 39).

Cold Shutdown and Allowable Repairs

RG 1.189 allows fire damage to redundant systems necessary to achieve CSD provided that at least one success path can be repaired or otherwise made operable within 72 hours using onsite capability, or within the time period required to achieve CSD conditions, if less than 72 hours. Although repairs to equipment necessary to achieve and maintain CSD may be permitted per the RG, the U.S. EPR design provides the capability to achieve cold shutdown conditions within 72 hours without the need for repairs to facilitate the use of one success path. This is the case whether CSD is achieved from the MCR or RSS. In addition, when shutdown is accomplished from either operating location, systems and equipment necessary to achieve CSD have the capability of being powered from onsite sources.

Spurious Operation of Components

The U.S. EPR plant digital control system design makes extensive use of fiber optic cable. The inherent design features of the digital control system and its associated fiber optic wiring eliminate fire-induced spurious actuations as a concern for the U.S. EPR plant. In support of this position, the Standard Review Plan (Reference 37), Section 9.5.1, Appendix A, Subsection 6.2, Item f, recognizes that on a macroscopic level the use of fiber optic cable reduces the overall likelihood of hot shorts and spurious actuations. Therefore, fire-induced failures of fiber optic wiring leading to spurious component actuations are not considered credible for the U.S. EPR Plant.

For those components where spurious actuation may be a concern, the U.S. EPR design provides reasonable assurance that one shutdown success path remains free of fire damage for a single fire in any single fire area by utilizing a deterministic analytical approach. In accordance with RG 1.189, components whose fire-induced spurious actuation could adversely impact safe shutdown are addressed and appropriate protection provided. The methodology employed in determining the potential type and number of spurious actuations to consider in any given fire area is that identified in NEI 00-01, Revision 2 (Reference 39), with the following exceptions:

from fire, an extra division beyond the minimum required for safe shutdown would be available.

9.5.1.3 Safety Evaluation – Fire Protection Analysis

The overall FPP allows the plant to maintain the ability to perform safe shutdown functions and minimize radioactive releases to the environment in the event of a fire. A major element of this program is the evaluation of potential fire hazards throughout the plant and the effect of postulated fires on safety-related plant areas. See Appendix 9A for the fire protection analysis.

The fire protection analysis evaluates the fire hazards for each area of the plant. Areas are evaluated with consideration of:

- The fuel loading, considering both in-situ and transient combustibles.
- The potential ignition sources and the expected fire severity levels.
- The consequences of postulated fires.
- The fire protection defense-in-depth features provided and the adequacy of these features to protect SSC important to safety.
- The means to ventilate exhaust or isolate each fire area and their adequacy.
- The effect on SSC important to safety due to normal or inadvertent operation of fire suppression systems, the loss of capability to ventilate, exhaust, or isolate due to a fire and flooding associated with automatic and manual fire suppression activities, including inadvertent operation or fire suppression system failure.
- The emergency lighting and plant communication systems and the adequacy of these systems to support fire suppression and safe shutdown activities.

The fire protection analysis includes a set of fire area drawings and a summary of the analysis methodology for each fire area.

~~A COL applicant that references the U.S. EPR design certification will evaluate the differences between the as-designed and as-built plant configuration to confirm the~~ The Fire Protection Analysis includes an evaluation of~~remains bounding. This evaluation will be performed prior to fuel loading and will consider~~ the final plant cable routing, fire barrier ratings, combustible loading, ignition sources, purchased equipment, and equipment arrangement. a~~nd includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The applicant will describe how this as-built evaluation will be performed and documented, and how the NRC will be made aware of deviations from the FSAR, if any.~~

specified for the material. Not more than one individual value shall be below the specified value and no individual value shall be lower than 70 percent of the specified value.

Curves of Charpy V-notch absorbed energy and percentage crystallinity versus test temperature are plotted for FATT determination. The method of measurement of crystallinity conforms to the requirements of ASTM A370. The FATT is determined as the temperature corresponding to 50 percent crystallinity using a minimum of ten test pieces.

Table 10.2-2—Turbine-Generator Material Data, provides a list of material specifications for turbine-generator components. Actual material properties of turbine rotors are obtained through precise destructive tests of actual samples from each turbine rotor. A COL applicant that references the U.S. EPR design certification will provide applicable material properties of the site-specific turbine rotor, including the method of calculating the fracture toughness properties~~, after the site-specific turbine has been procured~~.

10.2.3.2 Fracture Toughness

As noted in Section 10.2.3.1, a suitable material toughness is obtained through the use of selected materials to produce a balance of adequate material strength and toughness and maintain a reasonable level of safety, while simultaneously providing high reliability, availability and efficiency during operation.

Stress calculations are performed taking into account centrifugal loads and thermal gradients, wherever applicable, on all major components (e.g., rotors, casings, blades). Fracture mechanics calculations are performed on the rotors taking into account the maximum acceptable size defect for U.S. standards. Calculations verify that the initial defect, after increasing due to fatigue during the equipment lifetime, does not propagate and remains non critical by a large margin as regards to brittle fracture.

The ratio of the fracture toughness, K_{Ic} (as calculated from the material tests performed on the rotor) to the maximum tangential stress at speeds from normal to 120 percent of the rated speed, is at least 2 $\sqrt{in}$, at minimum operating temperature. Adequate fracture toughness to prevent brittle fracture during startup is verified by calculating startup curves specifying appropriate startup temperature and sufficient warm-up time.

The acceptance criteria for UT inspections are:

- 3 mm maximum for discs (depending on the areas).
- 5 mm maximum for shaft ends (depending on the areas).

Fracture toughness properties are calculated from material tests and can be obtained by any of the following methods:

- Testing of the actual material of the turbine rotor to establish the Klc value at normal operating temperature.
- Testing of the actual material of the turbine rotor with an instrumented Charpy machine and a fatigue precracked specimen to establish the Klc (dynamic) value at normal operating temperature. If this method is used, Klc (dynamic) is used in lieu of Klc (static) in meeting the toughness criteria.
- Estimating of K_{lc} values at various temperatures from conventional Charpy and tensile data on the rotor material using methods are presented in J. A. Begley and W. A. Logsdon, Scientific Paper 71-1E7-MSLRF-P1 (Reference 5). This method of obtaining K_{lc} is used only on materials which exhibit a well-defined Charpy energy and fracture appearance transition curve and are strain-rate insensitive.
- Estimating "lower bound" values of Klc at various temperatures using the equivalent energy concept developed by F. J. Witt and T. R. Mager, ORNL-TM-3894 (Reference 6).

A COL applicant that references the U.S. EPR design certification will provide applicable site-specific turbine disk rotor specimen test data, load-displacement data from the compact tension specimens and fracture toughness properties ~~after the site-specific turbine has been procured~~.

10.2.3.3 High Temperature Properties

There is no influence on stress rupture properties because the maximum operating temperature, the basis for determining the design temperature of rotors, is below the re-crystallization and creep temperatures.

10.2.3.4 Turbine Rotor Design

The high pressure (HP) part of the high/intermediate pressure (HIP) rotor assembly is one forged section. The intermediate pressure (IP) part of the HIP rotor assembly consists of three forged sections. The HIP rotor assembly is a welded rotor consisting of four forgings. The rotors of the LP turbines are a welded rotor design.

The turbine assembly is designed to withstand normal operating conditions, anticipated transients, and accidents resulting in a turbine trip without loss of structural integrity. The design of the turbine assembly meets the following criteria:

- The design overspeed of the turbine is 120 percent of rated speed, which is higher than the highest anticipated speed resulting from a loss of load. The primary overspeed trip system fully closes the valves at about 110 percent of rated speed. An independent and redundant backup electrical overspeed trip circuit is provided to fully close these valves at about 111 percent of rated speed.

that piping material selections are appropriate for the operating conditions and that the systems are resistant to FAC, erosion, corrosion, and cavitation.

During the design phase, an evaluation of FAC will be performed for the main steam supply system, main feedwater system, condensate system, steam generator blowdown system, and the non-safety-related power conversion systems. In addition to main pipe lines, the evaluation will include drains, vents, and bypass piping in the aforementioned systems.

The minimum design wall thicknesses will be determined in the design phase by the process previously described in order to allow for a minimum lifetime of the affected piping systems of at least 40 years.

The COL applicant that references the U.S. EPR design certification will describe essential elements of ~~develop and implement~~ a FAC condition monitoring program that is consistent with Generic Letter 89-08 and NSAC-202L-R3 for the carbon steel portions of the steam and power conversion systems that contain water or wet steam ~~prior to initial fuel loading~~.

10.3.7 References

1. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Facility Components," The American Society of Mechanical Engineers, 2004.

2. ANSI/ASME B31.1-2004, "Power Piping," The American Society of Mechanical Engineers, 2004.

3. ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NC including Article NC-7000:"Overpressure Protection," The American Society of Mechanical Engineers, 2004.

4. NUREG-0800, BTP 5-4, "Design Requirements of the Residual Heat Removal System," U.S. Nuclear Regulatory Commission, Rev. 4, March 2007.

5. NUREG-0138, Issue 1, "Staff Discussion of Fifteen Technical Issues," Nuclear Regulatory Commission, November 1976.

6. ASME Boiler and Pressure Vessel Code, Section XI: "Rules for Inservice Inspection of Nuclear Power Plant Components," The American Society of Mechanical Engineers, 2004.

7. NEI 97-06, "Steam Generator Program Guidelines," Nuclear Energy Institute, 1997.

8. NEI 03-08,"Guideline for the Management of Materials Issues," Nuclear Energy Institute, 2003.

- Uncontrolled Control Rod Assembly Withdrawal from a Subcritical or Low Power Startup Condition.
- Uncontrolled Control Rod Assembly Withdrawal at Power.
- Spectrum of Rod Ejection Accidents.
- Loss-of-Coolant Accidents Resulting from Spectrum of Postulated Piping Breaks within the Reactor Coolant Pressure Boundary.

Transient Analysis with Incore Trips

The transient analysis is performed with incore trip models decoupled from the system simulation code, S-RELAP5. The incore trip models are generically referred to as the "algorithm" or separately as the Low DNB Channel algorithm and High LPD Channel algorithm. The core boundary conditions for the algorithm are generated in S-RELAP5 and power distributions are generated in the nodal neutronics code, PRISM.

The Low DNB Channel and High LPD Channel algorithms are simulated to predict times at which the incore trip setpoints are reached, and to demonstrate the adequacy of the dynamic compensation on the trips. Table 15.0-7 lists the incore trip setpoints used in the accident analyses. The methodology for confirming the dynamic compensation is described in Section 9.4 of Reference 2.

The Low DNB Channel and High LPD Channel algorithms use the following measurements:

- The reactor power distributions derived from the SPNDs, which are part of the nuclear incore instrumentation.
- The primary system pressure derived from the primary pressure sensors.
- The core flow derived from the reactor coolant pump (RCP) speed sensors and the calibrated volumetric flow from a surveillance measurement.
- The reactor inlet temperature derived from the cold leg temperature sensors.

A COL applicant that references the U.S. EPR design certification will provide~~, prior to the first cycle of operation,~~ a report that demonstrates compliance with the following items applicable to the first cycle of operation:

- Examine fuel assembly characteristics to verify that they are hydraulically compatible based on the criterion that a single package of assembly specific critical heat flux (CHF) correlations can be used to evaluate the assembly performance.
- Verify that uncertainties used in the setpoint analyses are appropriate for the plant and cycle being analyzed.

Rule-related responsibilities consistent with the provisions of Section 13.2 as applicable. Training will be commensurate with maintenance rule responsibilities, including Maintenance Rule Program administration, the expert panel process, operations, engineering, maintenance, licensing, and plant management.

17.6.6 Maintenance Rule Program Role in Implementation of Reliability Assurance Program (RAP) in the Operations Phase

A COL applicant referencing the U.S. EPR Design Certification will describe the relationship and interface between Maintenance Rule Program and the Reliability Assurance Program (refer to Section 17.4).

17.6.7 Maintenance Rule Program Relationship with Industry Operating Experience Activities

Industry operating experience (IOE) comprises information from a variety of sources that is applicable and available to the nuclear industry with the intent of minimizing, through shared experiences, adverse plant conditions or situations. Sources of IOE include information programs organized by the reactor vendor, safety-related equipment suppliers, the NRC, the Institute of Nuclear Power Operations (INPO), and the Electric Power Research Institute (EPRI).

IOE is reviewed for plant-specific applicability and, where appropriate, is applied in various elements of the Maintenance Rule Program and procedures, including scoping, performance/condition criteria development, monitoring, goal-setting, corrective action, training, program assessment, and maintenance and procurement activities. The specific steps for employing IOE in the various Maintenance Rule Program areas will be contained in the plan or process for maintenance rule implementation described in Section 17.6.8.

17.6.8 Maintenance Rule Program Implementation

A COL applicant referencing the U.S. EPR Design Certification will describe the plan or process for implementing the Maintenance Rule Program as described in the COL application, which includes establishing program elements through sequence and milestones and monitoring or tracking the performance and/or condition of SSC as they become operational. ~~The Maintenance Rule Program will be implemented by the time that fuel load is authorized.~~

19.1.2.2 PRA Level of Detail

To be effective in supporting the design process and to provide meaningful results with regard to judging the overall risk posed by the design, the PRA reflects a level of detail limited only by the following:

- The availability of certain design details, operating procedures, and other information.
- The level at which useful reliability data are available.

At the present time, elements of the detailed design that are not available to support the PRA include the following:

- The specific routing of piping. This information is particularly useful in the assessment of internal flooding events.
- The routing of control and power cables, which is relevant to a detailed assessment of internal fire events.
- The specific location of some equipment within plant buildings.
- Emergency and other operating procedures that would define the manner in which operating crews would respond to upset conditions and the specific actions they would be expected to take.

Analysis has been performed that is consistent with the level of detail available. For example, calculations of the frequencies of internal flooding events due to pipe failures account for the expected number of pipe segments in relevant systems (which are available), rather than the length of piping (which is not). In the case of internal fire events, the frequencies and the evaluation of equipment that could be affected reflect bounding assumptions. These assumptions have been refined, within the context of the available information, to avoid masking risk contributors from other sources due to overly conservative treatment.

A COL applicant that references the U.S. EPR design certification will describe the process to review as-designed and as-built information and conduct walk-downs as necessary to confirm that the assumptions used in the PRA, including PRA inputs to RAP and severe accident mitigation design alternatives (SAMDA), remain valid with respect to internal events, internal flooding and fire events (routings and locations of pipe, cable and conduit), and human reliability analyses (HRA) (i.e., development of operating procedures, emergency operating procedures and severe accident management guidelines and training), external events including PRA-based seismic margins, high confidence, low probability of failure (HCLPF) fragilities, and low power shutdown (LPSD) procedures.

The PRA reflects the details of system design configurations consistent with the design submitted to the NRC for design certification. However, some design change features have not been specifically included in the PRA model. Refer to Section 19.1.2.4 for information on design changes.

19.1.2.3 PRA Technical Adequacy

The content of the PRA and the steps taken to provide for its technical quality are consistent with the guidance in the PRA Standard (Reference 3, Reference 4, and Reference 5). The ASME PRA Standard presents high-level requirements and, for each of these, a set of more detailed supporting requirements. The supporting requirements are related to the three capability categories addressed in the standard. These requirements were generally formulated for application to operating nuclear power plants, and in some cases cannot be explicitly satisfied for a PRA performed in the design phase. Table 19.1-1—Characterization of U.S. EPR PRA Relative to Supporting Requirements in ASME PRA Standard provides a summary of the degree to which the U.S. EPR PRA relates to the capability categories for the nine technical elements addressed in the PRA Standard.

A COL applicant that references the U.S. EPR design certification will conduct a peer review of the PRA relative to the ASME PRA Standard prior to use of the PRA to support risk-informed applications ~~or before fuel load~~.

The U.S. EPR design development and probabilistic evaluation of its design features have benefited from the international cooperation between the U.S. and European divisions of AREVA NP. This cooperation includes sharing of PRA experience and technology through technical review meetings, independent reviews, and collaborative work assignments. This interaction has helped development of the U.S. EPR PRA models and provides added assurance that the U.S. EPR PRA approach is technically adequate, uses mature PRA techniques, and is sufficient to meet the PRA objectives for design certification.

The ASME PRA Standard does not address external events, low power shutdown or internal fire events. For these types of analyses where the ASME PRA Standard does not apply, AREVA NP has employed the latest NRC guidance available to perform assessments commensurate with the uses of the PRA. This additional guidance includes the following:

- Internal fire analysis. NRC has not yet endorsed a fire-PRA standard. The internal fire analysis for the U.S. EPR PRA employs the guidance provided in NUREG/CR-6850 (Reference 6) as practical. This report documents the most up-to-date methodology available for practical assessment of internal fires in nuclear power plants. Limitations in applying this methodology because some design details are not yet available are addressed below and in Section 19.1.5.2.

The SAMGs address the recognized need to provide nuclear power plant technical staff with structured guidance for response to a potential severe accident condition involving core damage and potential release of fission products to the environment. AREVA NP has developed a new approach to SAMGs in a project called Operating Strategies for Severe Accidents (OSSA). The OSSA framework makes maximum use of the lessons learned to date in the field of severe accidents and incorporates a number of new features which simplify and streamline the guidance material while maintaining comprehensive guidance for response to any severe accident. The OSSA framework is described in ANP-10314, "The Operating Strategies for Severe Accidents Methodology for the U.S. EPR Technical Report" (Reference 23).

The purpose of this section is to describe the OSSA framework for the U.S. EPR SAMGs. The high-level actions that would need to be taken to mitigate severe accidents are described in the context of the unique severe accident design features of the U.S. EPR. The potential challenges that need to be addressed by the technical support center team and the OSSA diagnostic tool used to mitigate these challenges are described.

A COL applicant that references the U.S. EPR design certification will develop and implement severe accident management guidelines ~~prior to fuel loading~~ using the Operating Strategies for Severe Accidents (OSSA) methodology described in this section and in Reference 23.

As stated in Section 19.1.2.2, the COL applicant will review final plant-specific EOPs and SAMGs to confirm that the assumptions used in the PRA and severe accident analyses remain valid.

19.2.5.1 Accident Management through Design

Severe accident management in the U.S. EPR begins with several design elements specifically addressing the stated objectives of maintaining fuel, RPV, and containment integrity while minimizing radiological releases. These design elements have been described in Section 19.2.2 and Section 19.2.3.

19.2.5.2 OSSA Directed Actions

The ultimate goal for the OSSA is to provide mitigation strategies to cover all potential events that lead to core melt and to stop or reduce the releases of fission products to the environment.

Considering containment challenges rather than accident scenarios promotes protection of the containment as priority in every case regardless of the accident sequence. The OSSA considers a broad range of sequences, even if not analyzed or quantified through the PRA Level 2 or through the supporting safety studies. For the severe accident sequences occurring in the Fuel Building, building failure is not a