ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Tuesday, July 20, 2010 5:24 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); KOWALSKI David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 4
Attachments: RAI 345 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule.

The attached file, "RAI 345 Supplement 4 Response US EPR DC.pdf" provides a technically correct and complete response to four questions and a technically correct and partial response to one question.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the responses to RAI 345 Questions 09.02.01-27, 09.02.01-30, 09.02.01-33, 09.02.01-34 and 09.02.01-43.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-27	2	3
RAI 345 — 09.02.01-30	4	5
RAI 345 — 09.02.01-33	6	6
RAI 345 — 09.02.01-34 (d and e)	7	9
RAI 345 — 09.02.01-43	10	11

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 345 — 09.02.01-26	August 31, 2010
RAI 345 — 09.02.01-28	August 31, 2010
RAI 345 — 09.02.01-29	August 31, 2010
RAI 345 — 09.02.01-31	August 31, 2010
RAI 345 — 09.02.01-32	August 31, 2010
RAI 345 — 09.02.01-34 (a, b and c)	August 31, 2010
RAI 345 — 09.02.01-35	August 31, 2010
RAI 345 — 09.02.01-36	August 31, 2010
RAI 345 — 09.02.01-38	August 31, 2010
RAI 345 — 09.02.01-39	August 31, 2010
RAI 345 — 09.02.01-41	August 31, 2010
RAI 345 — 09.02.01-42	August 31, 2010

RAI 345 — 09.02.01-44	August 31, 2010
RAI 345 — 09.02.01-45	August 31, 2010
RAI 345 — 09.02.01-46	August 31, 2010
RAI 345 — 09.02.01-47	August 31, 2010
RAI 345 — 09.02.01-48	August 31, 2010
RAI 345 — 09.02.01-49	August 31, 2010
RAI 345 — 09.02.01-50	August 31, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
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From: BRYAN Martin (EXT)
Sent: Thursday, July 08, 2010 3:55 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 3

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the remaining 23 questions has been revised and is provided below.

Question #	Response Date
RAI 345 — 09.02.01-26	August 31, 2010
RAI 345 — 09.02.01-27	July 16, 2010
RAI 345 — 09.02.01-28	August 31, 2010
RAI 345 — 09.02.01-29	August 31, 2010
RAI 345 — 09.02.01-30	July 16, 2010
RAI 345 — 09.02.01-31	August 31, 2010
RAI 345 — 09.02.01-32	August 31, 2010
RAI 345 — 09.02.01-33	July 16, 2010
RAI 345 — 09.02.01-34	July 16, 2010
RAI 345 — 09.02.01-35	August 31, 2010
RAI 345 — 09.02.01-36	August 31, 2010
RAI 345 — 09.02.01-38	August 31, 2010
RAI 345 — 09.02.01-39	August 31, 2010
RAI 345 — 09.02.01-41	August 31, 2010
RAI 345 — 09.02.01-42	August 31, 2010
RAI 345 — 09.02.01-43	July 16, 2010

RAI 345 — 09.02.01-44	August 31, 2010
RAI 345 — 09.02.01-45	August 31, 2010
RAI 345 — 09.02.01-46	August 31, 2010
RAI 345 — 09.02.01-47	August 31, 2010
RAI 345 — 09.02.01-48	August 31, 2010
RAI 345 — 09.02.01-49	August 31, 2010
RAI 345 — 09.02.01-50	August 31, 2010

Sincerely,

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From: BRYAN Martin (EXT)
Sent: Tuesday, June 22, 2010 1:23 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule.

The attached file, "RAI 345 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to two of the questions, as committed.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-37	2	3
RAI 345 — 09.02.01-40	4	4

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

Question #	Response Date
RAI 345 — 09.02.01-26	July 22, 2010
RAI 345 — 09.02.01-27	July 22, 2010
RAI 345 — 09.02.01-28	July 22, 2010
RAI 345 — 09.02.01-29	July 8, 2010
RAI 345 — 09.02.01-30	July 8, 2010
RAI 345 — 09.02.01-31	July 22, 2010
RAI 345 — 09.02.01-32	July 22, 2010
RAI 345 — 09.02.01-33	July 22, 2010

RAI 345 — 09.02.01-34	July 8, 2010
RAI 345 — 09.02.01-35	July 22, 2010
RAI 345 — 09.02.01-36	July 22, 2010
RAI 345 — 09.02.01-38	July 22, 2010
RAI 345 — 09.02.01-39	July 22, 2010
RAI 345 — 09.02.01-41	July 22, 2010
RAI 345 — 09.02.01-42	July 8, 2010
RAI 345 — 09.02.01-43	July 8, 2010
RAI 345 — 09.02.01-44	July 8, 2010
RAI 345 — 09.02.01-45	July 8, 2010
RAI 345 — 09.02.01-46	July 8, 2010
RAI 345 — 09.02.01-47	July 22, 2010
RAI 345 — 09.02.01-48	July 22, 2010
RAI 345 — 09.02.01-49	July 22, 2010
RAI 345 — 09.02.01-50	July 8, 2010

Sincerely,

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From: BRYAN Martin (EXT)
Sent: Friday, June 04, 2010 2:04 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010.

The responses to the questions in RAI 345 are in various stages of preparation or review with the NRC. The revised response dates below are relative to the where the question is in this process.

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

Question #	Response Date
RAI 345 — 09.02.01-26	July 22, 2010
RAI 345 — 09.02.01-27	July 22, 2010
RAI 345 — 09.02.01-28	July 22, 2010
RAI 345 — 09.02.01-29	July 8, 2010
RAI 345 — 09.02.01-30	July 8, 2010
RAI 345 — 09.02.01-31	July 22, 2010
RAI 345 — 09.02.01-32	July 22, 2010
RAI 345 — 09.02.01-33	July 22, 2010
RAI 345 — 09.02.01-34	July 8, 2010

RAI 345 — 09.02.01-35	July 22, 2010
RAI 345 — 09.02.01-36	July 22, 2010
RAI 345 — 09.02.01-37	June 22, 2010
RAI 345 — 09.02.01-38	July 22, 2010
RAI 345 — 09.02.01-39	July 22, 2010
RAI 345 — 09.02.01-40	June 22, 2010
RAI 345 — 09.02.01-41	July 22, 2010
RAI 345 — 09.02.01-42	July 8, 2010
RAI 345 — 09.02.01-43	July 8, 2010
RAI 345 — 09.02.01-44	July 8, 2010
RAI 345 — 09.02.01-45	July 8, 2010
RAI 345 — 09.02.01-46	July 8, 2010
RAI 345 — 09.02.01-47	July 22, 2010
RAI 345 — 09.02.01-48	July 22, 2010
RAI 345 — 09.02.01-49	July 22, 2010
RAI 345 — 09.02.01-50	July 8, 2010

Sincerely,

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From: BRYAN Martin (EXT)
Sent: Friday, April 02, 2010 5:34 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345 (4021), FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 345 Response US EPR DC," provides a schedule since technically correct and complete responses to the twenty five questions are not provided.

The following table indicates the respective pages in the response document, "RAI 345 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-26	2	3
RAI 345 — 09.02.01-27	4	4
RAI 345 — 09.02.01-28	5	6
RAI 345 — 09.02.01-29	7	7
RAI 345 — 09.02.01-30	8	8
RAI 345 — 09.02.01-31	9	9
RAI 345 — 09.02.01-32	10	10
RAI 345 — 09.02.01-33	11	11
RAI 345 — 09.02.01-34	12	13

RAI 345 — 09.02.01-35	14	15
RAI 345 — 09.02.01-36	16	17
RAI 345 — 09.02.01-37	18	18
RAI 345 — 09.02.01-38	19	19
RAI 345 — 09.02.01-39	20	20
RAI 345 — 09.02.01-40	21	21
RAI 345 — 09.02.01-41	22	22
RAI 345 — 09.02.01-42	23	23
RAI 345 — 09.02.01-43	24	24
RAI 345 — 09.02.01-44	25	25
RAI 345 — 09.02.01-45	26	26
RAI 345 — 09.02.01-46	27	27
RAI 345 — 09.02.01-47	28	28
RAI 345 — 09.02.01-48	29	29
RAI 345 — 09.02.01-49	30	31
RAI 345 — 09.02.01-50	32	32

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

Question #	**Response Date**
RAI 345 — 09.02.01-26	June 4, 2010
RAI 345 — 09.02.01-27	June 4, 2010
RAI 345 — 09.02.01-28	June 4, 2010
RAI 345 — 09.02.01-29	June 4, 2010
RAI 345 — 09.02.01-30	June 4, 2010
RAI 345 — 09.02.01-31	June 4, 2010
RAI 345 — 09.02.01-32	June 4, 2010
RAI 345 — 09.02.01-33	June 4, 2010
RAI 345 — 09.02.01-34	June 4, 2010
RAI 345 — 09.02.01-35	June 4, 2010
RAI 345 — 09.02.01-36	June 4, 2010
RAI 345 — 09.02.01-37	June 4, 2010
RAI 345 — 09.02.01-38	June 4, 2010
RAI 345 — 09.02.01-39	June 4, 2010
RAI 345 — 09.02.01-40	June 4, 2010
RAI 345 — 09.02.01-41	June 4, 2010
RAI 345 — 09.02.01-42	June 4, 2010
RAI 345 — 09.02.01-43	June 4, 2010
RAI 345 — 09.02.01-44	June 4, 2010
RAI 345 — 09.02.01-45	June 4, 2010
RAI 345 — 09.02.01-46	June 4, 2010
RAI 345 — 09.02.01-47	June 4, 2010
RAI 345 — 09.02.01-48	June 4, 2010
RAI 345 — 09.02.01-49	June 4, 2010
RAI 345 — 09.02.01-50	June 4, 2010

Sincerely,

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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Thursday, March 04, 2010 2:49 PM
To: ZZ-DL-A-USEPR-DL
Cc: Wheeler, Larry; Lee, Samuel; Segala, John; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 345 (4021), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on December 10, 2009, and discussed with your staff on March 4, 2010. Drat RAI Questions 09.02.01-31, 09.02.01-47, and 09.02.01-48 were modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 1728

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB7106EE526E)

Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 4
Sent Date: 7/20/2010 5:23:39 PM
Received Date: 7/20/2010 5:24:24 PM
From: BRYAN Martin (EXTERNAL AREVA)

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

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Files	**Size**	**Date & Time**
MESSAGE	13685	7/20/2010 5:24:24 PM
RAI 345 Supplement 4 Response US EPR DC.pdf	218919	

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

Response to

Request for Additional Information No. 345, Supplement 4

3/04/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.02.01 - Station Service Water System
Application Section: 9.2.1

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

Question 09.02.01-27:

Follow-up to RAI 119, Question 9.2.1-02

The ESWS must be able to withstand natural phenomena without the loss of function in accordance with GDC 2 requirements. The system description does not explain the functioning and maximum allowed combined seat leakage of safety-related boundary isolation valves to ensure ESWS integrity and operability during seismic events and other natural phenomena. Consequently, the applicant needs to include additional information in Tier 2 Section 9.2.1 of the FSAR to fully describe: (a) how ESWS integrity and operability is assured by the safety-related boundary isolation valves so that common-cause simultaneous failure of all non-safety-related ESWS piping will not compromise the ESWS safety functions during seismic events, (b) what the maximum allowed combined seat leakage is for the safety-related ESWS boundary isolation valves (including check valve for the non-safety-related dedicated ESWS cooling water supply for the Division 4 ESWS room cooler) and periodic testing that will be performed to ensure that the specified limit will not be exceeded, and (c) a description of any other performance assumptions that pertain to the boundary isolation valves or other parts of the system that are necessary to assure the capability of the ESWS to perform its safety functions during natural phenomena.

Based on the staff's review of response RAI 119, Question 9.2.1-02 and an audit by the staff conducted on October 27, 2009, the following item remains open and requires further resolution and/or clarification by the applicant.

In regard to part (b), valve seat leakage, the staff found the applicant's explanation that valve leakage was accounted for in determination of the volume required to support the first 72 hours of post accident UHS cooling tower operation as partially acceptable, including the referenced criteria used to determine valve leakage. The provided markup of FSAR Section 9.2.1.3.5 was acceptable to the staff and confirmed to have been incorporated in Revision 1 of the application. Additionally, Tier 2 FSAR Table 3.9.6-2, "In-service Valve Testing Program Requirements," was reviewed by the staff and found to include all the boundary valves relevant to the cooling tower basin. However, the applicant should address valve seat leak testing (LT) which is not specified for these ESWS boundary isolation valves by the In-service Valve Testing Program per FSAR Tier 2 Table 3.9.6-2.

Response to Question 09.02.01-27:

Valve seat leak testing (LT) has been specified for the essential service water system (ESWS) boundary isolation valves 30PEB10/20/30/40 AA003, 30PEB10/20/30/40 AA015, and 30PEB10/20/30/40 AA016 in the inservice testing program for valves. LT has been added as a required test for these boundary isolation valves, and the ASME OM Code Category has been changed from B to A. For the dedicated system check valve upstream of the Division 4 pump room cooler, Valve 30PEB41 AA011, LT has been added as a required test, and the ASME OM Code Category has been changed from C to A/C. The safety position has been changed from open to close.

U.S. EPR FSAR Tier 2, Table 3.9.6-2—Inservice Valve Testing Program Requirements will be revised to reflect these changes.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 3.9.6-2 will be revised as described in the response and indicated on the enclosed markup.

Question 09.02.01-30:

Follow-up to RAI 119, Question 9.2.1-04 (f)

The ESWS must be capable of removing heat from structures, systems and components (SSCs) important to safety during normal operating and accident conditions over the life of the plant in accordance with GDC 44 requirements. The ESWS description and P&ID were reviewed to assess the design adequacy of the ESWS for performing its heat removal functions. While the P&ID shows the ESWS components and identifies the boundaries between safety-related and non-safety-related parts of the system, some of the information is incomplete, inaccurate, or inconsistent. Consequently, the applicant needs to revise the FSAR to address the following considerations in this regard:

> Part (f)- The P&ID does not show a flow indicator for the ESWS pump room coolers and additional discussion is needed to explain how the ESWS flow rate through the pump room coolers will be periodically verified and confirmed to be adequate.

Based on the staff's review of response to RAI 119, Question 9.2.1-04 and an audit by the staff conducted on October 27, 2009, Part (f) remains open and requires further resolution and/or clarification by the applicant. The following description provides the results of the staff's evaluation of the applicant's initial response and justification for the item remaining open.

> The staff reviewed the applicant's response to part (f) of RAI-response 9.2.1-04 above relative to means of periodic confirmation of the adequacy of ESW pump room cooler flow. In this response, the applicant stated that temporary flow instrumentation will be installed for the performance of periodic cooler surveillance testing and testing after repairs. The staff found this response to be unacceptable since plant operators will not have valuable information related to ESWS possible degraded flow rates or degraded heat exchanger performance. This instrumentation should be described in the FSAR.

Response to Question 09.02.01-30:

The information in this response is provided in addition to the information submitted in the Response to RAI 119, Supplement 1, Question 09.02.01-04 (f):

Indication of the essential service water (ESW) pump building room temperature is provided in the main control room (MCR) as listed in U.S. EPR FSAR Tier 1, Table 2.6.13-2. ESW temperature measurement is provided at the discharge of the essential service water system (ESWS) pump and will be added downstream of the pump building ventilation system room cooler. Differential pressure across the cooler and temperature indications are available in the MCR. Plant operators will have information related to possible ESW degraded flow rates or degraded cooler performance. The differential pressure is available locally.

This information will be included in U.S. EPR FSAR Tier 2, Section 9.2.1.7.1.

Indication of temperature measurement downstream of the pump building ventilation system room cooler will be added to U.S. EPR FSAR Tier 2, Figure 9.2.1-1. New instrumentation will be added to U.S. EPR FSAR Tier 2, Table 3.10-1 and Table 3.11-1.

U.S. EPR FSAR Tier 2, Section 9.2.1.7.2 and Table 9.2.1-3 were evaluated as part of this response and no changes are required.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 3.10-1, Table 3.11-1, Section 9.2.1.7.1, and Figure 9.2.1-1 will be revised as described in the response and indicated on the enclosed markup.

Question 09.02.01-33:

Follow-up to RAI 119, Question 9.2.1-07

The ESWS must be capable of removing heat from SSCs important to safety during normal operating and accident conditions over the life of the plant in accordance with GDC 44 requirements. With respect to ESWS flow requirements, Tier 2 FSAR Table 9.2.1-1 states that the safety related ESWS pump normal flow rate is 73.2 m3/min (19,340 gpm) at 0.55 MPa (185 feet) of water. Each ESWS train includes parallel connected flow paths to one CCWS heat exchanger (HX), one emergency diesel generator (EDG) and an ESWS pump room cooler. ESWS flow appears to be continuously supplied to all components for both normal and accident conditions. Tier 2 FSAR Table 9.2.5-1 indicates that nominal CCWS HX flow is 4.31x106 Kg/hr (9.504x106 lbm/hr) and EDG flow is 0.48x106 Kg/hr (1.06x106 lbm/hr). No flow rate information (or heat load) is provided for the pump room cooler. However, the total ESWS flow rate for the EDG plus the CCW HX at <32.2 °C (90 °F) converts roughly to 80.25 m3/min (21,200 gpm), which exceeds the normal pump flow of 73.2 m3/min (19,340 gpm). In order for the staff to confirm that the ESWS has been adequately sized, the applicant needs to provide additional information in the FSAR to address this apparent inconsistency.

Based on the staff's review of response to RAI 119, Question 9.2.1-07 and an audit by the staff conducted on October 27, 2009, this item remains open and requires further resolution and/or clarification by the applicant. The following description provides the results of the staff's evaluation of the applicant's initial response and justification for the item remaining open.

> The staff noted an inconsistency with the new flow rate units (gpm) for the ESW Pump Room Coolers, which do not match the mass flow units identified for other components in the Table or the units (106 lbm/hr) identified by the column heading. The applicant should revise the FSAR to address this inconsistency in the units.

Response to Question 09.02.01-33:

The flow rate units for the essential service water (ESW) pump room coolers will be revised in U.S. EPR FSAR Tier 2, Table 9.2.5-1 to match the mass flow units (10^6 lbm/hr) identified for other components in the table by the column heading.

The flow rate value for the ESW pump room coolers for 31/32/33/34 UQB has been revised to 0.0685×10^6 lb_m/hr for normal operations, shutdown/cool down, and design basis accident (DBA). The flow rate value for the ESW pump room cooler for 34 UQB has been revised to 0.0347×10^6 lb_m/hr for severe accident – ESW flow supplied by the dedicated ESW pump.

FSAR Impact:

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

Question 09.02.01-34:

Follow-up to RAI 119 Question 9.2.1-08

The ESWS must be capable of removing heat from SSCs important to safety during normal operating and accident conditions over the life of the plant in accordance with GDC 44 requirements. In order to satisfy system flow requirements, the ESWS design must assure that the minimum net positive suction head (NPSH) for the ESWS pumps will be met for all postulated conditions, including consideration of vortex formation. The staff found that the NPSH requirement for the ESWS pumps was not specified and Tier 2 FSAR Section 9.2.1 did not describe how the ESWS design will assure that the NPSH requirement for the ESWS pumps is satisfied (including consideration of vortex formation) and how much excess margin is provided by the ESWS design for the most limiting assumptions. Consequently, the applicant needs to provide additional information in Tier 2 FSAR Section 9.2.1 to specify the minimum NPSH requirement for the ESWS pumps and fully explain how the minimum NPSH requirement by the system design when taking vortex formation into consideration is satisfied. In addition, excess margin available for the most limiting case should be provided. Sufficient information is needed to enable the staff to independently confirm that the design is adequate in this regard, including limiting assumptions that were used along with supporting justification.

Based on the staff's review of response RAI 119 Question 9.2.1-08 and an audit by the staff conducted on October 27, 2009, this item remains open and requires further resolution and/or clarification by the applicant. The following description provides the results of the staff's evaluation of the applicant's initial response and justification for the item remaining open.

The staff's found several points in the response and proposed FSAR markup that require further explanation, clarification or additional information. These points are provided below and require resolution to support completion of the staff's evaluation of this subject.

a. The minimum worst case cooling tower basin water level after 72 hours of post accident operation (reference Tier 2, FSAR Section 9.2.5.3.1, "Mechanical Draft Cooling Towers,") needs to be identified in order to address the actual margin between NPSH available and NPSH required. This approach will provide a more meaningful assessment of NPSH margin.

b. The response indicates that the basin water level necessary for vortex suppression was found to be more limiting than that required to satisfy NPSH but does not specifically state what levels were determined.

c. Related to the item above, the applicant needs to state the basis for the "height for minimum pump submergence" of 3.0 m (119 inches) (identified in Figure 09.02.01-17-1). This height is inconsistent with the height of 2.4 m (95 inches) identified in the FSAR markup. Clarify the discrepancy.

d. With regard to the markup of U.S FSAR Tier 2 Table 9.2.1-1, the description for the new line item states "Required Minimum Water Level in the Basin" does not agree with the corresponding "Technical Data," which indicates that 2.4 m (95 inches) is from the suction inlet. This comment also applies to the corresponding addition to U.S.EPR FSAR Table 9.2.1-2 for the dedicated ESW pump. In order to completely define basin water level, the distance between the pump suction inlet and the bottom of the basin needs to be clearly identified.

e. Identify the assumptions used for calculating available NPSH (e.g. atmospheric pressure, centerline elevation of inlet to the first stage impeller etc). Sufficient information along with the supporting justification is needed to enable the staff to confirm the results in accordance with SRP 9.2.1.

Response to Question 09.02.01-34:

a) A response to this question will be provided by August 31, 2010.

b) A response to this question will be provided by August 31, 2010.

c) A response to this question will be provided by August 31, 2010.

d) The distance between the pump suction inlet and the bottom of the basin is 24 inches.

e) Regarding the assumptions used for calculating available NPSH, the system fluid is water at the maximum design ultimate heat sink (UHS) outlet water temperature during a design basis accident (DBA) (95°F). This temperature will be added to U.S. EPR FSAR Tier 2, Table 9.2.1-1. The temperature is bounding for the basin water temperature after 72 hours following a DBA.

The available NPSH is calculated using the formula:

$NPSHA = h_{atm} + h_{se} + h_{vp} + h_{ch}$.

h_{atm} = atmospheric pressure.

h_{se} = total suction head.

h_{vp} = absolute vapor pressure of the liquid.

h_{ch} = head to added to account for chemical effects in water.

The atmospheric pressure is assumed at 14.69 psia (33.93 feet), which is based on an elevation at sea level. The atmospheric pressure is assumed at sea level but varies based on location and altitude.

The elevation of the impeller eye is 42.69 inches from the bottom of the basin (elevation -12.44 feet).

The minimum water level at the end of 72 hours is elevation -6.08 feet.

The total suction head considers the minimum height for pump submergence to the elevation of the pump impeller. Total suction head at the end of 72 hours is the 6.36 feet (-6.08 feet- (-12.44 feet)).

The vapor pressure of water is 1.89 feet for the maximum UHS tower basin water temperature of 95°F.

The head added to account for the effects of chemical in water is six feet.

$NPSHA_{SEA\ LEVEL}$ = 33.93 feet + 6.36 feet -1.89 feet - 6 feet = 32.40 feet of water (after the first 72 hours following a DBA).

At elevation 1000 feet, the atmospheric pressure is assumed at 14.19 psia (32.73 feet).

$NPSHA_{1000}$ = 32.73 feet + 6.36 feet -1.89 feet - 6 feet = 31.20 feet of water (after the first 72 hours following a DBA).

From the Response to RAI 119, Supplement 1, Question 09.02.01-9, the pump design sizing assumes maximum reduction in available NPSH of 6 feet, so the margin between design NPSH reduction and actual NPSH reduction is available. The addition of water treatment chemicals to the essential service water system (ESWS) increases the water vapor pressure, resulting in available NPSH reduction of as much as six feet, according to ANSI/HI 9.6.1-1998, Section 9.6.1.5.4, Part c. The actual range of increase in water vapor pressure would depend on actual water chemistry.

To further define the basin temperature range and the ESW supply water temperature, the maximum cooling tower basin temperature limit during normal plant operation to verify UHS performance in a DBA, 90°F, will be added to U.S. EPR FSAR Tier 2, Table 9.2.1-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 9.2.1-1 will be revised as described in the response and indicated on the enclosed markup.

Question 09.02.01-43:

Follow-up to RAI 119, Question 9.2.1-19

The Bases for TS 3.7.8 (Page B 3.7.8-1) states that for an accident: "The pumps aligned to the critical loops are automatically started upon receipt of a safety injection signal, and all essential valves are aligned to their post accident position." However, no description of what the critical loops are or what valves must be realigned is provided in Tier 2 FSAR Section 9.2.1 or in the TS Bases. Therefore, the applicant needs to provide additional information in Tier 2 FSAR Section 9.2.1 to fully describe these design features and operating considerations.

Based on the staff's review of response to RAI 119, Question 9.2.1-19 and an audit by the staff conducted on October 27, 2009, this item remains open and requires further resolution and/or clarification by the applicant. The following description provides the results of the staff's evaluation of the applicant's initial response and justification for the item remaining open.

> No response or FSAR markup was provided by the applicant with regard to identification of "essential valves that must be realigned to their post accident position." As previously identified, FSAR Tier 2 Section 9.2.1 does not presently include sufficient functional descriptions for several key system valves that automatically re-align in response to an accident or a pump start/ stop (e.g. AA005, AA010 etc.).

Response to Question 09.02.01-43:

The following valves receive a signal to automatically align to their post accident position (closed) upon receipt of a safety injection signal:

- Essential service water system (ESWS) normal blowdown isolation valves 30PEB10/20/30/40 AA016.
- Cooling tower emergency blowdown system isolation valves 30PEB10/20/30/40 AA003.
- Debris filter blowdown isolation valves 30PEB10/20/30/40 AA015.
- ESWS cooling tower bypass isolation valves 30PED10/20/30/40 AA011.
- ESWS normal makeup water isolation valves 30PED10/20/30/40 AA019.
- ESWS pump recirculation isolation valves 30PEB10/20/30/40 AA002.

The following valves receive a signal to automatically align to their post accident position (open) upon receipt of a safety injection signal:

- ESWS pump discharge isolation valves 30PEB10/20/30/40 AA005.
- ESWS cooling tower return isolation valves 30PED10/20/30/40 AA010.
- ESWS emergency makeup water isolation valves 30PED10/20/30/40 AA021.

The following valves are automatically re-aligned in response to a pump start/stop:

- ESWS pump discharge isolation valves 30PEB10/20/30/40 AA005 (open/closed).
- ESWS cooling tower return isolation valves, 30PED10/20/30/40 AA010 (open/closed).

U.S. EPR FSAR Tier 2, Section 9.2.1.7 will be revised to include this information.

According to U.S. EPR FSAR Tier 1, Table 2.7.11-3, Item 7.3, these valves can perform the function listed in U.S. EPR FSAR Tier 1, Table 2.7.11-1 under system operating conditions, which includes safety injection (SI).

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.2.1.7 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
30PEB10AA003	Emer. blowdown isolation PEB10	BF	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB10AA005	Pump discharge isolation PEB10 AP001	BF	MO	3	B	A	O	ET PI	Q 2Y	
30PEB10AA007	Isolation upstreamKAA10 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB10AA009	Isolation downstream KAA10 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB10AA015	Filter blowdown isolation PEB10 AP001	GT	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB10AA016	Blowdown isolation PEB10	GB	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB10AA190	Air release from Filter 30PEB10AT002 ~~downstream PEB10 AP001~~	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB11AA191	Vacuum breaker downstream SAQ10 AC001	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	

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Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
30PEB20AA002	Recirculation Isolation PEB20 AP001	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB20AA003	Emergency blowdown Isolation PEB20	BF	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB20AA005	Pump discharge Isolation PEB20 AP001	BF	MO	3	B	A	O	ET PI	Q 2Y	
30PEB20AA007	Isolation upstream KAA20 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB20AA009	Isolation downstream KAA20 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB20AA015	Filter blowdown Isolation PEB20 AP001	GT	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB20AA016	Blowdown Isolation PEB20	GB	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB20AA190	Air release from Filter 30PEB20AT002 ~~downstream PEB20 AP001~~	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	

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Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
30PEB22AA196	Thermal relief downstream 30XJG20 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB23AA001	Isolation upstream XJG30 AC002	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB23AA002	Isolation downstream XJG30 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB23AA195	Air release 30XJG30 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB23AA196	Thermal relief downstream 30XJG30 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB30AA002	Recirculation Isolation PEB30 AP001	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB30AA003	Emergency Blowdown Isolation PEB30	BF	MO 09.02.01-27	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB30AA005	Pump Discharge Isolation PEB30 AP001	BF	MO	3	B	A	O	ET PI	Q 2Y	
30PEB30AA007	Isolation upstream KAA30 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	

Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
30PEB30AA009	Isolation downstream KAA30 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB30AA015	Filter blowdown Isolation PEB30 AP001	GT	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB30AA016	Blowdown Isolation PEB30	GB	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB30AA190	Air release from Filter 30PEB30AT002 ~~downstream PEB30 AP001~~	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB31AA191	Vacuum breaker downstream SAQ30 AC001	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PEB30AA192	Thermal relief downstream KAA30 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB30AA204	Pump Discharge Check PEB30 AP001	CK	SA	3	C	A	O	ET	Q	
~~30PEB30AA205~~	~~Blowdown check PEB30~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~A~~	~~C~~	~~ET~~	~~Q~~	

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Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
30PEB31AA001	Isolation upstream SAQ30 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB31AA002	Isolation downstream SAQ30 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB24AA001	Isolation upstream XJG40 AC002	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB24AA002	Isolation downstream XJG40 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB24AA195	Air release 30XJG40 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB24AA196	Thermal relief downstream 30XJG40 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB40AA002	Recirculation Isolation PEB40 AP001	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB40AA003	Emergency Blowdown Isolation PEB40	BF	MO 09.02.01-27	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB40AA005	Pump Discharge Isolation PEB40 AP001	BF	MO	3	B	A	O	ET PI	Q 2Y	

Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
30PEB40AA007	Isolation upstream KAA40 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB40AA009	Isolation downstream KAA40 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB40AA015	Filter blowdown Isolation PEB40 AP001	GT	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB40AA016	Blowdown Isolation PEB40	GB	MO	3	~~B~~A	A	C	ET PI LT	Q 2Y 2Y	
30PEB40AA190	Air release from Filter 30PEB40AT002 ~~downstream PEB40 AP001~~	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB41AA191	Vacuum breaker downstream SAQ40 AC001	RV	SA	3	C	A	O/C	ET LT PI	2Y 10Y 2Y	
30PEB40AA192	Thermal relief downstream KAA40 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB40AA204	Pump Discharge Check PEB40 AP001	CK	SA	3	C	A	O	ET	Q	

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Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10]	Test Frequency[9]	Comments
~~30PEB40AA205~~	~~Blowdown check PEB40~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~A~~	~~C~~	~~ET~~	~~Q~~	
30PEB41AA001	Isolation upstream SAQ40 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB41AA002	Isolation downstream SAQ40 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB41AA011	DED SYSTEM Check upstream SAQ40 AC001	CK	SA 09.02.01-27	3	A/C	A	~~O~~C	ET PI LT	Q 2Y 2Y	
~~30PEB80AA002~~	~~Pump Discharge Check PEB80 AP001~~	~~CK~~	~~SA~~	~~3~~	~~C~~	~~A~~	~~O~~	~~ET~~	~~Q~~	
~~30PEB80AA003~~	~~Isolation upstream KAA80 AC001~~	~~BF~~	~~MA~~	~~3~~	~~B~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~5Y~~ ~~2Y~~	
30PEB80AA004	Isolation downstream KAA80 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
~~30PEB80AA009~~	~~Filter blowdown Isolation PEB80 AP001~~	~~GT~~	~~MO~~	~~3~~	~~B~~	~~A~~	~~O~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	
~~30PEB80AA015~~	~~Recirculation Isolation PEB80 AP001~~	~~BF~~	~~MO~~	~~3~~	~~B~~	~~A~~	~~C~~	~~ET~~ ~~PI~~	~~Q~~ ~~2Y~~	

Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)		EQ Program Designation (Note 5)	
SAQ HX DP Measurement	30PEB11CP001	31UQB02001	M	M	SI	S			Y (5)
SAQ HX Outlet Temp Measurement	30PEB11CT001	31UQB02001	M	M	SI	S			Y (5)
CCW HX Inlet Isolation Vlv	30PEB20AA007	32UJH05020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Outlet Isolation Vlv	30PEB20AA009	32UJH05020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Tube Side Thermal Relief Vlv	30PEB20AA192	32UJH05020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Inlet Side DP Root Vlv	30PEB20AA306	32UJH10020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Outlet Side DP Root Vlv	30PEB20AA307	32UJH10020	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB20AA401	32UJH01020	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB20AA402	32UJH10020	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB20AA403	32UJH01020	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB20AA405	32UJH01020	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB20AA407	32UJH05020	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB20AA408	32UJH01020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Tube Side Vent Vlv	30PEB20AA508	32UJH10020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Tube Side Vent Vlv	30PEB20AA509	32UJH10020	M	H	SI	S	C/NM	Y (3)	Y (5)
Orifice Plate	30PEB20BP002	32UJH05020	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX DP Measurement	30PEB20CP004	32UJH05020	M	H	SI	S			Y (5)
CCW HX Outlet Temp Measurement	30PEB20CT002	32UJH05020	M	H	SI	S			Y (5)
EDG HXs Inlet Isolation Vlv	30PEB21AA001	31UBP01001	M	M	SI	S	C/NM		Y (5)
EDG HXs Outlet Isolation Vlv	30PEB21AA002	31UBP01001	M	M	SI	S	C/NM		Y (5)
EDG Water Jacket HX Air Release Vlv	30PEB21AA195	31UBP01001	M	M	SI	S	C/NM		Y (5)
EDG HX Tube Side Thermal Relief Vlv	30PEB21AA196	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Pressure Measurement Root Vlv	30PEB21AA301	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Pressure Measurement Root Vlv	30PEB21AA302	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Pressure Measurement Root Vlv	30PEB21AA303	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Pressure Measurement Root Vlv	30PEB21AA304	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Drain Isolation Vlv	30PEB21AA401	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Drain Isolation Vlv	30PEB21AA402	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Drain Isolation Vlv	30PEB21AA403	31UBP01001	M	M	SI	S	C/NM		Y (5)
ESW Drain Isolation Vlv	30PEB21AA404	31UBP01001	M	M	SI	S	C/NM		Y (5)
EDG HX Tube Side Vent Vlv	30PEB21AA501	31UBP01001	M	M	SI	S	C/NM		Y (5)
EDG HX Tube Side Vent Vlv	30PEB21AA502	31UBP01001	M	M	SI	S	C/NM		Y (5)
EDG HX Tube Side Vent Vlv	30PEB21AA503	31UBP01001	M	M	SI	S	C/NM		Y (5)

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Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)	EQ Program Designation (Note 5)
Orifice Plate	30PEB21BP003	31UBP01001	M	M	SI	S C/NM	Y (5)
EDG HXs Outlet Flow Measurement	30PEB21CF001	31UBP01001	M	M	ES ~~PAM~~ SI	S	Y (5)
SAQ HX DP Measurement	30PEB21CP001	32UQB02001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB21CP201	31UBP01001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB21CP202	31UBP01001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB21CP203	31UBP01001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB21CP204	31UBP01001	M	M	SI	S	Y (5)
SAQ HX Outlet Temp Measurement	30PEB21CT001	32UQB02001	M	M	SI	S	Y (5)
EDG HX Outlet Temp Measurement	30PEB21CT201	31UBP01001	M	M	SI	S	Y (5)
EDG HX Outlet Temp Measurement	30PEB21CT202	31UBP01001	M	M	SI	S	Y (5)
EDG HX Outlet Temp Measurement	30PEB21CT203	31UBP01001	M	M	SI	S	Y (5)
EDG HXs Inlet Isolation Vlv	30PEB22AA001	32UBP01001	M	M	09.02.01-30 SI	S C/NM	Y (5)
EDG HXs Outlet Isolation Vlv	30PEB22AA002	32UBP01001	M	M	SI	S C/NM	Y (5)
EDG Water Jacket HX Air Release Vlv	30PEB22AA195	32UBP01001	M	M	SI	S C/NM	Y (5)
EDG HX Tube Side Thermal Relief Vlv	30PEB22AA196	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Pressure Measurement Root Vlv	30PEB22AA301	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Pressure Measurement Root Vlv	30PEB22AA302	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Pressure Measurement Root Vlv	30PEB22AA303	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Pressure Measurement Root Vlv	30PEB22AA304	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Drain Isolation Vlv	30PEB22AA401	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Drain Isolation Vlv	30PEB22AA402	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Drain Isolation Vlv	30PEB22AA403	32UBP01001	M	M	SI	S C/NM	Y (5)
ESW Drain Isolation Vlv	30PEB22AA404	32UBP01001	M	M	SI	S C/NM	Y (5)
EDG HX Tube Side Vent Vlv	30PEB22AA501	32UBP01001	M	M	SI	S C/NM	Y (5)
EDG HX Tube Side Vent Vlv	30PEB22AA502	32UBP01001	M	M	SI	S C/NM	Y (5)
EDG HX Tube Side Vent Vlv	30PEB22AA503	32UBP01001	M	M	SI	S C/NM	Y (5)
Orifice Plate	30PEB22BP003	32UBP01001	M	M	SI	S C/NM	Y (5)
EDG HXs Outlet Flow Measurement	30PEB22CF001	32UBP01001	M	M	ES ~~PAM~~ SI	S	Y (5)
ESW Pressure Measurement	30PEB22CP201	32UBP01001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB22CP202	32UBP01001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB22CP203	32UBP01001	M	M	SI	S	Y (5)
ESW Pressure Measurement	30PEB22CP204	32UBP01001	M	M	SI	S	Y (5)
EDG HX Outlet Temp Measurement	30PEB22CT201	32UBP01001	M	M	SI	S	Y (5)

Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)		EQ Program Designation (Note 5)	
SAQ HX DP Measurement	30PEB31CP001	33UQB02001	M	M	SI	S			Y (5)
SAQ HX Outlet Temp Measurement	30PEB31CT001	33UQB02001	M	M	SI	S			Y (5)
CCW HX Inlet Isolation Vlv	30PEB40AA007	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Outlet Isolation Vlv	30PEB40AA009	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Tube Side Thermal Relief Vlv	30PEB40AA192	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Inlet Side DP Root Vlv	30PEB40AA306	34UJH10026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Outlet Side DP Root Vlv	30PEB40AA307	34UJH10026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB40AA401	34UJH01026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB40AA402	34UJH10026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB40AA403	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB40AA405	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB40AA407	34UJH01026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB40AA408	34UJH01026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Tube Side Vent Vlv	30PEB40AA508	34UJH10026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX Tube Side Vent Vlv	30PEB40AA509	34UJH10026	M	H	SI	S	C/NM	Y (3)	Y (5)
Orifice Plate	30PEB40BP002	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
CCW HX DP Measurement	30PEB40CP004	34UJH05026	M	H	SI	S			Y (5)
CCW HX Outlet Temp Measurement	30PEB40CT002	34UJH05026	M	H	SI	S			Y (5)
SAQ HX DP Measurement	30PEB41CP001	34UQB02001	M	M	SI	S			Y (5)
SAQ HX Outlet Temp Measurement	30PEB41CT001	34UQB02001	M	M	SI	S			Y (5)
CCW HX Outlet Isolation Vlv	30PEB80AA004	34UJH05026	M	H	SI	S	C/NM	Y (3)	Y (5)
ESW Drain Isolation Vlv	30PEB80AA405	34UJH01026	M	H	SI	S	C/NM	Y (3)	Y (5)
Safety Chilled Water System (SCWS)									
QKA Cross-Tie Valve, Div 1	30QKA10AA102	31UJK22028	M	M	SI	S	C/NM		Y(5)
QKA Cross-Tie Valve, Div 1	30QKA10AA103	31UJK22028	M	M	SI	S	C/NM		Y(5)
QK Tank Isol Valve, Div 1	30QKA10AA001	31UJK26029	M	M	SI	S	C/NM		Y (5)
QK Pmp #1 Suct Isol Valve, Div 1	30QKA10AA002	31UJK22028	M	M	SI	S	C/NM		Y (5)
QK Pmp #1 Disch Check Valve, Div 1	30QKA10AA003	31UJK22028	M	M	SI	S			Y (5)
QK Pmp #1 Disch Isol Valve, Div 1	30QKA10AA004	31UJK22028	M	M	SI	S	C/NM		Y (5)
QK Chiller Dnstrm Flow Reg Valve, Div 1	30QKA10AA005	31UJK22028	M	M	SI	S	C/NM		Y (5)
QK Chiller Dnstrm Isol Valve, Div 1	30QKA10AA006	31UJK22028	M	M	SI	S	C/NM		Y (5)
QKA10AT001 Upstrm Isol Valve, Div 1	30QKA10AA007	31UJK26029	M	M	SI	S	C/NM		Y (5)
QKA10AT001 Dnstrm Flow Reg Valve, Div 1	30QKA10AA008	31UJK26029	M	M	SI	S	C/NM		Y (5)

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Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)				EQ Program Designation (Note 5)			
G Cls *KAB70AA013*	30KAB70CG013B	34UJH10004	M	H	ES	SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G Opng *KAB70AA018*	30KAB70CG018A	30UJA11016	H	H	ES	SI	S	1E	EMC		Y (1)		Y (5)	
G Cls *KAB70AA018*	30KAB70CG018B	30UJA11016	H	H	ES	SI	S	1E	EMC		Y (1)		Y (5)	
G Opng *KAB70AA019*	30KAB70CG019A	34UJH10004	M	H	ES	SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G CLS *KAB70AA019*	30KAB70CG019B	34UJH10004	M	H	ES	SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G Meas *KAB70AA116*	30KAB70CG116	30UJA11016	H	H		SI	S	1E	EMC		Y (1)		Y (5)	
G Opng *70AA191*	30KAB70CG191A	30UJA11016	H	H		SI	S	1E	EMC		Y (1)		Y (5)	
G Acty CCWS Inlet	30KAB70CR001	30UJA11016	H	H		SI	S	1E	EMC		Y (1)		Y (5)	
G Acty CCWS Outlet	30KAB70CR002	30UJA11016	H	H		SI	S	1E	EMC		Y (1)		Y (5)	
T Dnstr CVCS HP Cl2	30KAB70CT082	30UJA11016	H	H		SI	S	1E	EMC		Y (1)		Y (5)	
F Upstr QNA21 AC002	30KAB80CF060	31UJH10004	M	H		SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
F Dnstr KAB80 Chil	30KAB80CF061	31UJH10004	M	H		SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G Opng *KAB80AA015*	30KAB80CG015A	31UJH10004	M	H		SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G Cls *KAB80AA015*	30KAB80CG015B	31UJH10004	M	H		SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G Opng *KAB80AA016*	30KAB80CG016A	31UJH10004	M	H		SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
G Cls *KAB80AA016*	30KAB80CG016B	31UJH10004	M	H		SI	S	1E	EMC			Y (2)	Y (5)	Y (6)
Essential Service Water System (ESWS)														
30PEB10 AA002 Valve Motor Actuator	30PEB10AA002	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
30PEB10 AA003 Valve Motor Actuator	30PEB10AA003	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
30PEB10 AA005 Valve Motor Actuator	30PEB10AA005	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
30PEB10 AA015 Valve Motor Actuator	30PEB10AA015	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
30PEB10 AA016 Valve Motor Actuator	30PEB10AA016	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
ESW Pump Motor Heater, Train 1	30PEB10AH500	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
ESW Pump Motor, Train 1	30PEB10AP001	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
30PEB10 AT002 Filter Motor Actuator	30PEB10AT002	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
ESW Pump Discharge Flow Indicator	30PEB10CF001	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
CCW HX Outlet Flow Measurement	30PEB10CF002	31UJH05026	M	H	ES	~~PAM~~ SI	S	1E				Y (2)	Y (5)	
UHS Tower Basin Level Indicator	30PEB10CL001	31URB01003	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
ESW Pump Discharge Pressure Indicator	30PEB10CP002	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
ESW Pump Filter Diff Pressure Indicator	30PEB10CP003	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
ESW Pump Discharge Thermocouple	30PEB10CT001	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
SAQ HX DP Measurement	30PEB11CP001	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)
SW Pump Bldg Cooler Pressure Indicator	30PEB11CP501	31UQB02001	M	M	ES	SI	S	1E	EMC				Y (5)	Y (6)

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Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)			Safety Class (Note 4)			EQ Program Designation (Note 5)		
SAQ HX Outlet Temp Measurement	30PEB11CT001	31UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB20 AA002 Valve Motor Actuator	30PEB20AA002	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB20 AA003 Valve Motor Actuator	30PEB20AA003	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB20 AA005 Valve Motor Actuator	30PEB20AA005	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB20 AA015 Valve Motor Actuator	30PEB20AA015	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB20 AA016 Valve Motor Actuator	30PEB20AA016	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Motor Heater, Train 2	30PEB20AH500	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Motor, Train 2	30PEB20AP001	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB20 AT002 Filter Motor Actuator	30PEB20AT002	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Flow Indicator	30PEB20CF001	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
CCW HX Outlet Flow Measurement	30PEB20CF002	32UJH05020	M	H	ES	~~PAM~~	SI	S	1E		Y (2)	Y (5)	
UHS Tower Basin Level Indicator	30PEB20CL001	32URB01003	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Pressure Indicator	30PEB20CP002	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Filter Diff Pressure Indicator	30PEB20CP003	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Thermocouple	30PEB20CT001	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
SAQ HX DP Measurement	30PEB21CP001	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
SW Pump Bldg Cooler Pressure Indicator	30PEB21CP501	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
SAQ HX Outlet Temp Measurement	30PEB21CT001	32UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB30 AA002 Valve Motor Actuator	30PEB30AA002	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB30 AA003 Valve Motor Actuator	30PEB30AA003	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB30 AA005 Valve Motor Actuator	30PEB30AA005	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB30 AA015 Valve Motor Actuator	30PEB30AA015	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB30 AA016 Valve Motor Actuator	30PEB30AA016	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Motor Heater, Train 3	30PEB30AH500	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Motor, Train 3	30PEB30AP001	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
30PEB30 AT002 Filter Motor Actuator	30PEB30AT002	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Flow Indicator	30PEB30CF001	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
CCW HX Outlet Flow Measurement	30PEB30CF002	33UJH05020	M	H	ES	~~PAM~~	SI	S	1E		Y (2)	Y (5)	
UHS Tower Basin Level Indicator	30PEB30CL001	33URB01003	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Pressure Indicator	30PEB30CP002	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Filter Diff Pressure Indicator	30PEB30CP003	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Thermocouple	30PEB30CT001	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)
SAQ HX DP Measurement	30PEB31CP001	33UQB02001	M	M	ES		SI	S	1E	EMC		Y (5)	Y (6)

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Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)			EQ Program Designation (Note 5)		
SW Pump Bldg Cooler Pressure Indicator	30PEB31CP501	33UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
SAQ HX Outlet Temp Measurement	30PEB31CT001	33UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PEB40 AA002 Valve Motor Actuator	30PEB40AA002	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PEB40 AA003 Valve Motor Actuator	30PEB40AA003	34UQB02001	M	M	ES	SI	S	1E	EMC	09.02.01-30	Y (5)	Y (6)
30PEB40 AA005 Valve Motor Actuator	30PEB40AA005	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PEB40 AA015 Valve Motor Actuator	30PEB40AA015	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PEB40 AA016 Valve Motor Actuator	30PEB40AA016	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Motor Heater, Train 4	30PEB40AH500	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Motor, Train 4	30PEB40AP001	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PEB40 AT002 Filter Motor Actuator	30PEB40AT002	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Flow Indicator	30PEB40CF001	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
CCW HX Outlet Flow Measurement	30PEB40CF002	34UJH05026	M	H	ES	~~PAM~~ SI	S	1E		Y (2)	Y (5)	
UHS Tower Basin Level Indicator	30PEB40CL001	34URB01003	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Pressure Indicator	30PEB40CP002	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Filter Diff Pressure Indicator	30PEB40CP003	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
ESW Pump Discharge Thermocouple	30PEB40CT001	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
SAQ HX DP Measurement	30PEB41CP001	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
SW Pump Bldg Cooler Pressure Indicator	30PEB41CP501	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
SAQ HX Outlet Temp Measurement	30PEB41CT001	34UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
~~ESW Pump Motor, Dedicated Train~~	~~30PEB80AP001~~	~~34UQB02001~~	~~M~~	~~M~~		~~SII~~	~~NS-AQ~~		~~EMC~~		~~Y (5)~~	~~Y (6)~~
30PED10 AA010 Valve Motor Actuator	30PED10AA010	31UQB02001	M	M	ES	SI	S	1E	EMC	09.02.01-30	Y (5)	Y (6)
30PED10 AA011 Valve Motor Actuator	30PED10AA011	31UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED10 AA019 Valve Motor Actuator	30PED10AA019	31UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED10 AA021 Valve Motor Actuator	30PED10AA021	31UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED10 AN001 Fan Motor	30PED10AN001	31URB03001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED10 AN002 Fan Motor	30PED10AN002	31URB03002	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED20 AA010 Valve Motor Actuator	30PED20AA010	32UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED20 AA011 Valve Motor Actuator	30PED20AA011	32UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED20 AA019 Valve Motor Actuator	30PED20AA019	32UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED20 AA021 Valve Motor Actuator	30PED20AA021	32UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED20 AN001 Fan Motor	30PED20AN001	32URB03001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED20 AN002 Fan Motor	30PED20AN002	32URB03002	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)
30PED30 AA010 Valve Motor Actuator	30PED30AA010	33UQB02001	M	M	ES	SI	S	1E	EMC		Y (5)	Y (6)

U.S. EPR FSAR Tier 2, Section 3.9 and Section 6.6 outline the inservice testing and inspection requirements. Refer to U.S. EPR FSAR Tier 2, Section 16.0, Surveillance Requirement (SR) 3.7.8 for surveillance requirements that verify continued operability of the ESWS.

Pursuant to the recommendations included in Generic Letter 89-13 (Reference 2), the design of safety-related portions of the ESWS considers the potential for capability and performance degradation and subsequent system failure due to siltation, erosion, corrosion, protective coating failure, and the presence of organisms that subject the system to microbiological influenced corrosion, as well as macro-fouling. A combination of design means, such as chemical treatment to reduce biological challenges; provisions to permit regular, periodic inspections, preventative maintenance, testing and performance trending; the use of best design practices for piping material selection and layout to minimize erosion and corrosion; and administrative controls in the form of operating, maintenance and emergency procedures, provide a level of assurance that the ESWS is able to perform its safety function when required.

Consistent with GL 89-13, design provisions of the ESWS accommodate performing the following:

- Identify and reduce the incidence of flow blockage problems caused from biofouling.
- Verify the heat transfer capability of safety-related heat exchangers connected to or cooled by the ESWS.
- Conduct routine inspection and maintenance activities of ESWS piping and components to provide assurance that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of safety-related systems supplied by ESW.

9.2.1.7 Instrumentation Requirements

Instrumentation is provided in order to control, monitor and maintain the safety-related and non-safety-related functions of the ESWS.

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Upon receipt of a safety injection signal, the following valves will receive a signal to automatically align to their post accident position as indicated:

- ESWS normal blowdown isolation valves 30PEB10/20130/40 AA016 (closed).
- Cooling tower emergency blowdown system isolation valves 30PEB10/20/30/40 AA003 (closed).
- Debris filter blowdown isolation valves 30PEB10/20130/40 AA015 (closed).

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- ESWS cooling tower bypass isolation valves 30PED10/20/30/40 AA011 (closed).
- ESWS normal makeup water isolation valves 30PED10/20/30/40 AA019 (closed).
- ESWS pump recirculation isolation valves 30PEB10/20/30/40 AA002 (closed).
- ESWS pump discharge isolation valves 30PEB10/20/30/40 AA005 (open).
- ESWS return header tower isolation valves 30PED10/20/30/40 AA010 (open).
- ESWS emergency makeup water isolation valves 30PED10/20/30/40 AA021 (open).

The following valves are automatically re-aligned in response to a pump start/stop:

- ESWS pump discharge isolation valves 30PEB10/20/30/40 AA005 (open/closed).
- ESWS return header isolation valves 30PEDl0/20/30/40 AA010 (open/closed).

9.2.1.7.1 System Monitoring

The ESWS system is monitored for the following parameters:

- Fluid flow rate and pressure downstream of the ESWS pumps and the dedicated ESWS pump.
- Differential pressure at the ESWS and the dedicated ESWS debris filters, CCWS HXs, and Essential Service Water Pump Building Ventilation System (SAQ) room cooler.
- Fluid flow from the CCWS and EDG HXs.
- Temperature of the ESWS and the dedicated ESWS pump discharge.
- Temperature at the outlet of the CCWS and EDG HXs and pump room coolers.

9.2.1.7.2 System Alarms

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- High temperature ESW and dedicated ESW.
- ESW and dedicated ESW pump abnormal.
- Low flow across the CCWS and dedicated CCWS HX.
- High ΔP across the CCWS, dedicated CCWS HX, and SAQ room cooler.
- Low temperature ESW.
- Table 9.2.1-3—Alarm Summary provides additional information.

Table 9.2.1-1—Essential Service Water Design Parameters

Essential Service Water Pump 30PEB10/20/30/40 AP001	
Description	Technical Data
Number	4
Type	Wet Pit Vertical Turbine
Normal Flow Rate	19,340 gpm
Required Pump Head at Normal Flow Rate	185 ft/H_2O
Required Minimum Water Level in the Basin	95 inches (from suction inlet)
Design Cold (UHS Outlet) Water Temperature, °F, (Max, DBA)	95
Max Cooling Tower Basin Temperature Limit during Normal Plant Operation to Verify UHS Performance in a DBA, °F, (Max)	90

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Table 9.2.1-2—Dedicated Essential Service Water Design Parameters

Dedicated Essential Service Water Pump 30PEB80 AP001	
Description	Technical Data
Number	1
Type	Wet Pit Vertical Turbine
Normal Flow Rate	2737 gpm
Required Pump Head at Normal Flow Rate	150 ft/H_2O
Required Minimum Water Level in the Basin	46 inches (from suction inlet)

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Figure 9.2.1-1—Essential Service Water System Piping & Instrumentation Diagram
Sheet 1 of 4

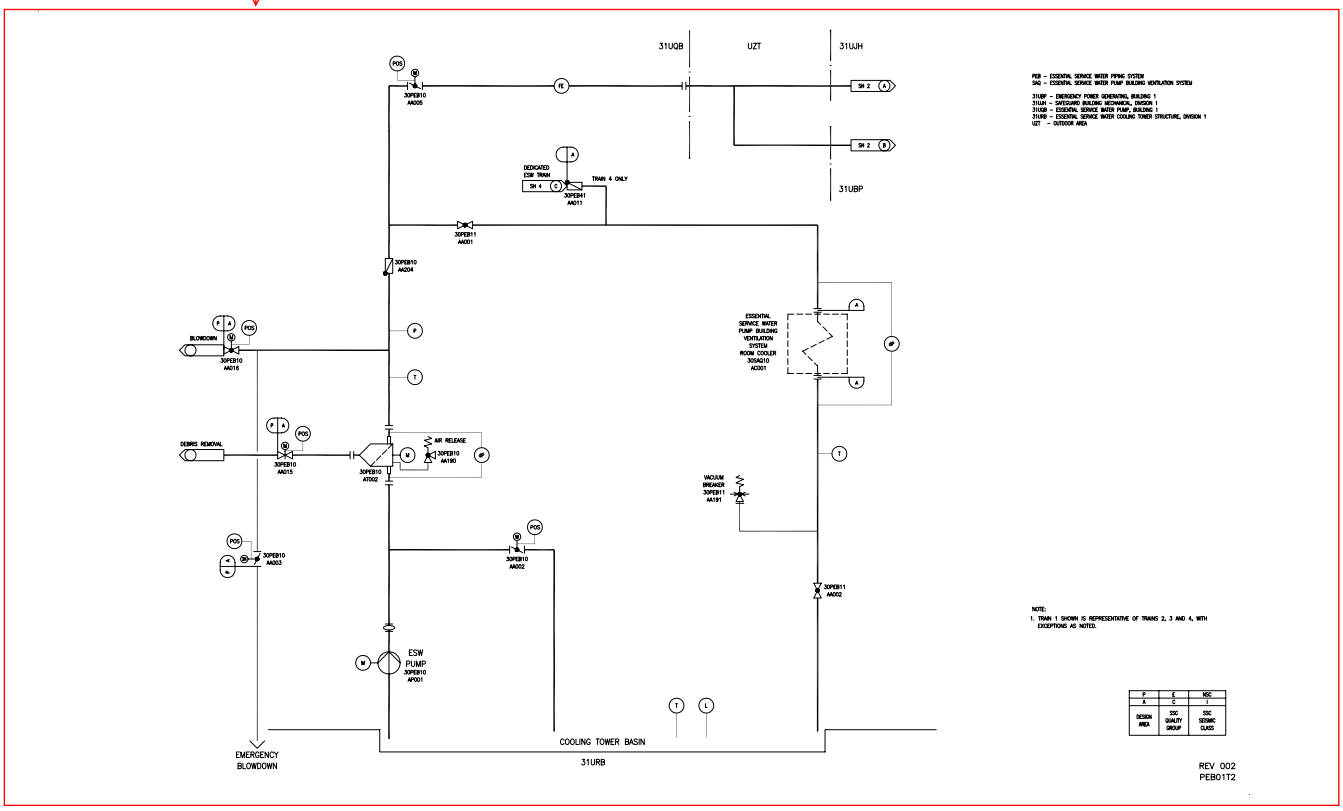

Table 9.2.5-1—Ultimate Heat Sink System Interface

Component	Max Heat Load MBTU/hr	Total Required ESW Flow (10^6 lb_m/hr)	Required ESW Temperature	Comments
CCWS heat exchanger	128.1	7.540 min	≤92°F	Normal Operation
	120.1	7.540 min	≤90°F	Spring/Fall Outage Cooldown
	291.3	7.540 min	≤95°F	DBA
Dedicated CCWS heat exchanger	48.64	1.205 min	≤95°F	Severe Accident
EDG heat exchanger	22.0	1.06	≤95°F	
ESW pump room cooler for 31/32/ 33/34 UQB	0.619	~~137.6 gpm~~0.0685	≤ 95°F	Normal Operations Shutdown/ Cooldown and DBA
ESW pump room cooler for 34 UQB	0.314	~~69.8 gpm~~0.0347	≤ 95°F	Severe Accident - ESW flow supplied by dedicated ESW pump

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