ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Thursday, January 31, 2013 5:00 PM
To: Snyder, Amy
Cc: Hearn, Peter; Ford, Tanya; DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); WILLS Tiffany (AREVA); KOWALSKI David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 11
Attachments: RAI 439 Supplement 11 Response US EPR DC - PUBLIC.pdf

Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, Supplement 4 on May 4, 2011, Supplement 5 on June 9, 2011, Supplement 6 on July 7, 2011, and Supplement 7 on August 15, 2011. Supplement 8 response was sent on September 2, 2011 to provide technically correct and complete responses to the 2 questions. Supplement 9 response was sent on January 3, 2013 to provide a schedule to address ACRS comments during the February 2012 ACRS Subcommittee Meeting for Chapter 3 in a revised final response to Question 14.03.07-36. A revised schedule was provided in Supplement 10 on January 22, 2013.

The attached file, "RAI 439 Supplement 11 Response US EPR DC –PUBLIC.pdf," provides a revised technically correct and complete final response to Question 14.03.07-36. Because the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This email and attached file do not contain any security-related information. An unredacted security-related version is provided under separate email.

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 439 Question 14.03.07-36.

The following table indicates the respective pages in the response document, "RAI 439 Supplement 11 Response US EPR DC – PUBLIC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 439 — 14.03.07-36	2	11

This concludes the formal AREVA NP response to RAI 439, and there are no questions from this RAI for which AREVA NP has not provided responses.

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: Tuesday, January 22, 2013 4:59 PM
To: Amy.Snyder@nrc.gov
Cc: DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); peter.hearn@nrc.gov; Michael.Miernicki@nrc.gov; KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 10
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, Supplement 4 on May 4, 2011, Supplement 5 on June 9, 2011, Supplement 6 on July 7, 2011, and Supplement 7 on August 15, 2011. Supplement 8 response was sent on September 2, 2011 to provide technically correct and complete responses to the 2 questions. Supplement 9 response was sent on January 3, 2013 to provide a schedule to address ACRS comments during the February 2012 ACRS Subcommittee Meeting for Chapter 3 in a revised final response to Question 14.03.07-36.

The schedule for a technically correct and complete revised final response for Question 14.03.07-36 has been changed as provided below:

Question #	Response Date
RAI 439 — 14.03.07-36	**January 31, 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, January 03, 2013 1:44 PM
To: Amy.Snyder@nrc.gov
Cc: DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); peter.hearn@nrc.gov
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 9

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, Supplement 4 on May 4, 2011, Supplement 5 on June 9, 2011, Supplement 6 on July 7, 2011, and Supplement 7 on August 15, 2011. Supplement 8 response was sent on September 2, 2011 to provide technically correct and complete responses to the 2 questions. To address ACRS comments during the February 2012 ACRS Subcommittee Meeting for Chapter 3, we have provided a schedule for a revised final response to Question 14.03.07-36.

The schedule for a technically correct and complete revised final response for Question 14.03.07-36 is provided below:

Question #	Response Date
RAI 439 — 14.03.07-36	**January 22, 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: Friday, September 02, 2011 2:25 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 8

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, Supplement 4 on May 4, 2011, Supplement 5 on June 9, 2011, Supplement 6 on July 7, 2011, and Supplement 7 on August 15, 2011.

The attached file, "RAI 439 Supplement 8 Response US EPR DC.pdf" provides technically correct and complete FINAL responses to the remaining two questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 439 Questions 14.02-162, and 14.03.07-36.

The following table indicates the respective pages in the response document, RAI 439 "Supplement 8 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 439 — 14.02-162	2	10
RAI 439 — 14.03.07-36	11	17

This concludes the formal AREVA NP response to RAI 439, and there are no questions from this RAI for which AREVA NP has not provided responses.

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: Monday, August 15, 2011 4:22 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 7

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, Supplement 4 on May 4, 2011, Supplement 5 on June 9, 2011, and Supplement 6 on July 7, 2011.

The schedule for a technically correct and complete FINAL response for this RAI has been revised as provided below:

Question #	Response Date
RAI 439 — 14.02-162	**September 2, 2011**
RAI 439 — 14.03.07-36	**September 2, 2011**

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, July 07, 2011 4:50 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 6

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, Supplement 4 on May 4, 2011, and Supplement 5 on June 9, 2011.

The schedule for a technically correct and complete FINAL response for this RAI has been revised and is provided below:

Question #	Response Date
RAI 439 — 14.02-162	**August 15, 2011**
RAI 439 — 14.03.07-36	**August 15, 2011**

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, June 09, 2011 1:13 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 5

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, Supplement 3 on March 16, 2011, and Supplement 4 on May 4, 2011.

The schedule for a technically correct and complete FINAL response for this RAI has been revised and is provided below:

Question #	Response Date
RAI 439 — 14.02-162	July 8, 2011
RAI 439 — 14.03.07-36	July 8, 2011

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: WELLS Russell (RS/NB)
Sent: Wednesday, May 04, 2011 1:06 PM
To: 'Tesfaye, Getachew'
Cc: LENTZ Tony (External RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 4

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010, Supplement 2 on February 16, 2011, and Supplement 3 on March 16, 2011.

In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response for this RAI has been revised and is provided below:

Question #	Response Date
RAI 439 — 14.02-162	June 9, 2011
RAI 439 — 14.03.07-36	June 9, 2011

Sincerely,

Russ Wells
U.S. EPR Design Certification Licensing Manager
AREVA NP, Inc.
3315 Old Forest Road, P.O. Box 10935
Mail Stop OF-57
Lynchburg, VA 24506-0935
Phone: 434-832-3884 (work)
434-942-6375 (cell)
Fax: 434-382-3884
Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)
Sent: Wednesday, March 16, 2011 3:14 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 3

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 2 questions in RAI No. 439 on September 27, 2010. A revised schedule was provided in Supplement 1 on November 23, 2010 and Supplement 2 on February 10, 2011.

In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response for this RAI has been revised and is provided below:

Question #	Response Date
RAI 439 — 14.02-162	May 5, 2011
RAI 439 — 14.03.07-36	May 5, 2011

Sincerely,

Russ Wells
U.S. EPR Design Certification Licensing Manager
AREVA NP, Inc.
3315 Old Forest Road, P.O. Box 10935
Mail Stop OF-57
Lynchburg, VA 24506-0935
Phone: 434-832-3884 (work)
434-942-6375 (cell)
Fax: 434-382-3884

Russell.Wells@Areva.com

From: BRYAN Martin (External RS/NB)
Sent: Thursday, February 10, 2011 10:37 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule on September 27, 2010 and November 22, 2010 (Supplement 1) for technically correct and complete responses to the two questions in RAI 439.

In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response for this RAI has been revised and is provided below:

Question #	Response Date
RAI 439 — 14.02-162	March 21, 2011
RAI 439 — 14.03.07-36	March 21, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, November 22, 2010 5:37 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule on September 27, 2010 for technically correct and complete responses to the two questions in RAI 439. AREVA NP needs additional time to prepare the response and interact with the NRC.

The revised schedule for a technically correct and complete response to 2 of the 2 questions is provided below:

Question #	Response Date
RAI 439 — 14.02-162	February 21, 2011
RAI 439 — 14.03.07-36	February 21, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, September 27, 2010 1:48 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 439 Response US EPR DC.pdf," provides the schedule for technically correct and complete responses to these questions.

The following table indicates the respective pages in the response document, "RAI 439 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 439 — 14.02-162	2	5
RAI 439 — 14.03.07-36	6	8

A complete answer is not provided for 2 of the 2 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 439 — 14.02-162	December 14, 2010
RAI 439 — 14.03.07-36	November 23, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Thursday, August 26, 2010 5:08 PM
To: ZZ-DL-A-USEPR-DL
Cc: Reddy, Devender; Lee, Samuel; Segala, John; Miernicki, Michael; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 439 (4802,4803), FSAR Ch. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 18, 2010, and on August 26, 2010, you informed us that the RAI is clear and no further

clarification is needed. As a result, no change is made to the draft RAI. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 4203

Mail Envelope Properties (554210743EFE354B8D5741BEB695E6560BFA9F)

Subject: Response to U.S. EPR Design Certification Application RAI No. 439, FSAR Ch. 14, Supplement 11
Sent Date: 1/31/2013 4:59:51 PM
Received Date: 1/31/2013 5:00:22 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
"Hearn, Peter" <Peter.Hearn@nrc.gov>
Tracking Status: None
"Ford, Tanya" <Tanya.Ford@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
"KOWALSKI David (AREVA)" <David.Kowalski@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	18527	1/31/2013 5:00:22 PM	
RAI 439 Supplement 11 Response US EPR DC - PUBLIC.pdf			1750225

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

Response to

Request for Additional Information No. 439, Supplement 11

8/26/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants
SRP Section: 14.03.07 - Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria

Application Sections: 14.2 & 14.3

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

Question 14.03.07-36:

The review procedures in SRP Section 14.3.7 provide guidance for determining the acceptability of proposed inspections, tests, analyses, and acceptance criteria (ITAAC). The SRP guidance specifies in part that all Tier 1 information is consistent with Tier 2 information and that plant systems are clearly described in Tier 1, including (for example) key performance characteristics. Tier 1 Section 2.8.1 establishes ITAAC for the turbine-generator. However, the staff found the descriptive information and corresponding ITAAC in this section to be inadequate. In particular, additional information is needed to address the following items:

1) Paragraph 2.0 is duplicated and this editorial error needs to be corrected.

2) Paragraph 1.0 indicates that turbine overspeed protection is provided by a separate turbine overspeed protection system, in addition to the normal speed control function. However, this description is incorrect in that turbine overspeed protection is provided by a primary turbine overspeed protection system and a backup turbine overspeed protection system, in addition to the normal speed control function. Consequently, this information needs to be corrected.

3) Paragraph 1a indicates that turbine stop and control valves will be inservice tested and inspected at intervals in accordance with industry practice or as specified by the manufacturer to meet turbine missile generation probability requirements. This does not appear to be reflected in Tier 2 of the FSAR and in particular, the considerations specified in Tier 2 Section 10.2.2.12 have not been included. Also, tests and inspections that are necessary for the extraction steam non-return valves are not specified. Therefore, the FSAR needs to be revised accordingly.

4) The basic configuration of the turbine-generator system is shown in Tier 1 Figure 2.8.1-1. However, the figure is incomplete in that it does not show all major components that are important to ensure that the turbine does not exceed design overspeed conditions. In particular, the figure needs to be revised to not only show the high pressure turbine stop and control valves, but the intermediate pressure turbine reheat stop and intercept valves and the extraction steam non-return valves (i.e., those that are important for preventing turbine overspeed) also need to be shown. Similarly, Tier 1 Table 2.8.1-1 needs to be revised to include these additional components.

5) Paragraph 2.1 indicates that the turbine-generator is favorably oriented with respect to protection from turbine missiles. However, the description needs to be more clear and specify that the orientation is favorable with respect to protection of safety-related SSCs from turbine missiles. Also, based on the description in Tier 2 Section 3.5.1.3, safety-related SSCs are located within the low-trajectory turbine missile strike zone and these safety-related SSCs need to be identified and the Tier 1 information needs to be revised accordingly.

6) Paragraph 3 and Item 3.1 in Tier 1 Table 2.8.1-3 specify that controls exist in the main control room to trip the turbine generator. However, there is no recognition of the need to provide similar controls locally at the turbine-generator to enable

plant operators (who are in the immediate vicinity of the turbine) to trip the turbine if the turbine control and overspeed protection systems should fail. Consequently, Tier 1 and Tier 2 of the FSAR need to be revised to reflect this information.

7) Paragraph 3.1 indicates that turbine-generator overspeed protection systems are listed in Tier 1 Table 2.8.1-2. However, the intent of this table is to list the equipment instrumentation and controls, and electrical design as reflected by the title of the table, "Turbine-Generator System Equipment I&C and Electrical Design." Consequently, this table needs to be revised to list the major I&C and electrical design components that make up each of the turbine-generator overspeed protection systems.

8) Paragraph 4.0, specifies that the turbine stop and control valves fail closed on a loss of power. Likewise, the intermediate pressure turbine reheat stop and intercept valves, and the extraction steam non-return valves are important for preventing turbine overspeed conditions and failure modes for these valves also need to be specified.

9) The information provided for Item 2.2 in Tier 1 Table 2.8.1-3 does not provide sufficient specificity to enable inspectors to complete this ITAAC. In particular, this item needs to be revised to address the following considerations:

   a. The first and third columns indicate that the orientation of the turbine generator is favorable with respect to protection from turbine missiles. To be clear, these columns need to be revised to indicate that the orientation of the turbine generator is favorable with respect to protection of safety-related SSCs from turbine missiles. Also, safety-related SSCs that are located in the low-trajectory turbine missile strike zone as allowed by the design certification need to be identified. For example, the following statement (or similar) could be used: "Safety-related SSCs that are located in the low-trajectory turbine missile strike zone are limited to [list those that apply]."

   b. For clarity, the second column needs to be revised to state that an inspection will be performed of the orientation of the turbine-generator with respect to the location of safety-related SSCs.

   c. The third column needs to specify what constitutes "favorable orientation" such as by referring to the figure in Regulatory Guide 1.115.

10) The information provided for Item 2.3 in Tier 1 Table 2.8.1-3 does not provide sufficient specificity to enable inspectors to complete this ITAAC. In particular, this item needs to be revised to identify the turbine-generator system equipment that is subject to inspection, such as by listing this information in Tier 1 tables and by making reference to these tables in the ITAAC.

11) The information provided for Item 3.1 in Tier 1 Table 2.8.1-3 does not provide sufficient specificity to enable inspectors to complete this ITAAC. In particular, the information in the second column needs to be revised to specify that

inspections and tests will be performed to confirm that (a) a manual trip device for tripping the turbine-generator is provided in the MCR; and (b) when actuated, the manual trip device generates control signals that will cause the valves listed in Tier 1 Table 2.8.1-1 to go closed. Also, a similar item needs to be established for the manual trip device that is located at the turbine.

12) The information provided for Item 3.2 in Tier 1 Table 2.8.1-3 does not provide sufficient specificity to enable inspectors to complete this ITAAC. In particular, the information in the second column needs to be revised to specify that tests will be performed to determine the trip setpoints for the primary and backup overspeed protection systems. The information in the third column needs to specify what the allowable trip setpoints are for the primary and backup turbine overspeed protection systems.

Response to Question 14.03.07-36:

This response to RAI 439, Question 14.03.07-36, Items 1 through 12, supersedes in its entirety the response provided to RAI 439 Question 14.03.07-36, in Supplement 8.

Item 1:

The duplication was corrected in U.S. EPR FSAR, Revision 2.

Item 2:

U.S. EPR FSAR Tier 1, Section 2.8.1, was revised in U.S. EPR FSAR, Revision 4, to include the following:

"Turbine overspeed control is provided by two independent, redundant and diverse backup electrical turbine overspeed protection systems, in addition to the normal speed control function. The primary and backup overspeed protection systems are included to minimize the possibility of turbine rotor failure and turbine missile generation."

Item 3:

In U.S. EPR FSAR, Revision 3, discussions of turbine inservice inspection requirements of turbine rotor components and turbine stop and control valves were deleted from U.S. EPR FSAR Tier 1, Section 2.8.1, on the basis that items covered by programs and that apply during operation (not construction or startup) are not the subject of ITAAC as noted in SRP Section 14.3, Page 14.3-14:

"In developing the ITAAC, the staff recognized that other programs ensure the continued safe operation of a facility after fuel load. For example, the continued operability of a facility after the ITAAC are satisfied is ensured through the Technical Specifications, Startup and Power Ascension Test Programs, as well as various programs such as the maintenance program, quality assurance program, and the in-service inspection and in-service testing program. Also, the operator ensures the facility is operated as designed, through the use of appropriate plant operating and emergency procedures."

U.S. EPR FSAR Tier 1, Section 2.8.1, was revised in U.S. EPR FSAR, Revision 4, to include the following:

> "Turbine rotor components, and turbine stop and control valves, will be periodically tested to meet the manufacturer's turbine missile generation probability requirements."

Item 4:

Certain aspects of the design that are discussed in U.S. EPR FSAR Tier 2 do not have ITAAC or do not need to be addressed in U.S. EPR FSAR Tier 1. Compliance with U.S. EPR FSAR Tier 2 information is required and inspection of the Tier 2 features that do not have ITAAC is addressed in NRC Inspection Manual Procedure, IMC 2504, Non-ITAAC Inspections. References to specific examples of this type of information in SRP Section 14.3 are provided below:

- SRP Section 14.3, Appendix A, Page 14.3-16.
- SRP Section 14.3, Appendix A, Page 14.3-17.
- SRP Section 14.3, Appendix C, II.B, Page 14.3-31.
- SRP Section 14.3, Appendix C, vi Alarms, Displays and Controls, Page 14.3-26.
- SRP Section 14.3, 1D, Page 14.3-9.
- SRP Section 14.3, Appendix C, Page 14.3-25.
- SRP Section 14.3, Appendix C, Page 14.3-27.
- SRP Section 14.3, Appendix C, Page 14.3-28.
- SRP Section 14.3.3, Piping Systems and Components, Page 14.3.3-7.

Some statements included in this question are not aligned with the guidance provided in SRP Section 14.3, regarding Tier 1 versus Tier 2, and to the NRC Inspection Manual associated with inspections. This relationship is documented numerous times in the SRP and NRC Inspection Manual as noted below:

1. SRP Section 14.3 Appendix A, Page 14.3-18:

   Tier 2 contains detailed supporting information for various inspections, tests, and analyses that can and should be used to verify the Tier 1 design information and satisfy the acceptance criteria. If questions on interpretation should arise, the material in Tier 2 provides the background material and context for Tier 1 information. Tier 2 contains information reviewed by the staff, which is the basis for the staff's safety determination for the design. Therefore, the information in Tier 2 provides an acceptable means, but not the only means, of satisfying an ITAAC.

2. IMC 2503 CIP: ITAAC Related Work

   03.18 Tier 2 Material. Tier 2 refers to the portion of the design-related information contained in the design control document that is approved but not certified by the NRC. Tier 2 information includes: Information required by 10 CFR52.47 with the exception of technical specifications and conceptual design information; Information required for a final safety

analysis report under 10 CFR 50.34; supporting information on ITAAC that will be performed to demonstrate that the acceptance criteria have been met; and Combined License (COL) information items, which identify certain matters that are addressed by a COL applicant that references a certified design. Tier 1 material is derived from Tier 2 material. Compliance with Tier 2 is required and demonstrates a sufficient but not the only method for complying with Tier 1.

3. IP 65001 Inspections of ITAAC Related Work

   03.01 Plan the inspection.

   Guidance:

   Comprehensive inspection planning should include the following:

   - Reviewing the applicable IP and the related ITAAC for the particular site design.
   - Reviewing the site design control document (DCD) and final safety analysis report (FSAR).

4. Precedence

   A review of other design certification applications determined that there is no precedent for the level of detail requested to be placed in U.S. EPR FSAR Tier 1. This is supported by the following SRP sections:

   SRP Section 14.3, Page 14.3-5, Item #3:

   > If applicable, review the DCD for a certified design similar to the design for which certification is sought, specifically the Tier 1 information, for the purpose of using a similar approach, format, and language and for familiarity with the treatment of SSCs, the appropriate level of design detail, and other certification issues.

   SRP Section 14.3, Appendix A, Page 14.3-9:

   > The purpose of this appendix is to describe how previous design certification applications have implemented the requirements of Subpart B of 10 CFR Part 52, so that this information can be used as guidance for review of new design certification applications.

Item 5:

Refer to the response to RAI 109, Supplement 3, Question 03.05.01.03-2 for changes associated with the turbine orientation with respect to safety-related SSCs.

U.S. EPR FSAR Tier 1, Section 2.8.1.2.2, will be revised to include the following:

> “The axis of the turbine rotor shafts is positioned such that safety-related structures, except for two of the four Essential Service Water Buildings, are located outside the turbine missile low-trajectory hazard zone. The low-trajectory hazard zone is defined as an area bounded

by lines that are inclined at 25 degrees to the turbine wheel planes and pass through the end wheels of the low pressure stages."

U.S. EPR FSAR Tier 1, Section 2.8.1.2.5, will be revised to include the following:

"The probability of turbine material and overspeed related failures resulting in external turbine missiles is < 1 x 10^{-5} per turbine year."

U.S. EPR FSAR Tier 1, Table 2.8.1-3–Turbine-Generator System ITAAC, Items 2.2, and 2.5, will be revised as specified in the following table.

	Commitment Wording	Inspections, Tests & Analyses	Acceptance Criteria
2.2	The axis of the turbine rotor shafts is positioned such that safety-related structures, except for two of the four Essential Service Water Buildings, are located outside the turbine missile low-trajectory hazard zone. The low-trajectory hazard zone is defined as an area bounded by lines that are inclined at 25 degrees to the turbine wheel planes and pass through the end wheels of the low pressure stages.	An inspection of the location of the axis of the turbine rotor shafts, with respect to safety-related structures will be performed.	Safety-related structures, except for two of the four Essential Service Water Buildings, are located outside the turbine missile low-trajectory hazard zone.
2.5	The probability of turbine material and overspeed related failures resulting in external turbine missiles is < 1 x 10^{-5} per turbine year.	A material and overspeed analysis will be performed on the as-built turbine design.	An analysis concludes that the probability of turbine material and overspeed related failures resulting in external turbine missiles is < 1 x 10^{-5} per turbine year.

Only two ESWBs are in the turbine missile low-trajectory hazard zone. The remaining ESWBs are not affected. Refer to the response to RAI 109, Supplement 3, Question 03.05.01.03-2.

This conclusion is based on the low-trajectory turbine missile strike zone defined in RG 1.115 and shown in Figure 14.03.07-36-1, and the location of the turbine shown in Figure 14.03.07-36-2 and its relationship to other buildings and structures as shown on the site layout (U.S. EPR FSAR Tier 2, Figure 3B-1 – Dimensional Arrangement Reference Plant Building Location.

The length of the low pressure (LP) stages of the first LP rotor is conservatively estimated by using the length between the centerline of the bearings on either side of the rotor, 338.5 inches (28 ft. - 2.5 in.). This length includes all dimensions and is conservative since the turbine blades are located with the two bearings; the actual distance between the last stage blades will be

shorter than used. In addition, the last stage blade will be farther from the Turbine Building wall than that used in Figure 14.03.07-36-02.

The note on U.S. EPR FSAR Tier 2, Figure 3B-1 will be revised to state the following:

> "The distance from the centerline of the first LP rotor inboard bearing and the centerline of the Reactor Building will be a minimum of 317 ft. – 1 in. [[The separation gap between the seismic category I structures and the access building (UKE) and between the seismic category I structures and the turbine building (UMA) are conceptual]]."

U.S. EPR FSAR Tier 2, Figure 1.2-37 – [[Turbine Building General Arrangement Plan View Elevation +65'-0" with Equipment]] will be revised to reflect a minimum distance of 105 ft. - 0 in. from the low pressure turbine stages to the turbine building wall and a distance of 212 ft. - 1 in, from the turbine building wall to the centerline of the reactor building.

As with Tier 1 material and ITAAC, the details for the commitment meanings and ITAAC are addressed in the Tier 2 discussion of the related subject. This is supported by SRP Section 14.3, Appendix A, Page 14.3-18:

> Tier 2 contains detailed supporting information for various inspections, tests, and analyses that can and should be used to verify the Tier 1 design information and satisfy the acceptance criteria. If questions on interpretation should arise, the material in Tier 2 provides the background material and context for Tier 1 information. Tier 2 contains information reviewed by the staff, which is the basis for the staff's safety determination for the design. Therefore, the information in Tier 2 provides an acceptable means, but not the only means, of satisfying an ITAAC.

Item 6:

Certain aspects of the design that are discussed in U.S. EPR FSAR Tier 2 do not have ITAAC or do not need to be addressed in U.S. EPR FSAR Tier 1, as discussed in SRP Section 14.3 and outlined in Item 4 of this Response. Additional information on the turbine overspeed protection system was provided in the Response to RAI 430, Supplement 17, Questions 10.02-9 and 10.02-10.

Item 7:

As discussed in Item #4 of this Response, U.S. EPR FSAR Tier 1 information is derived from U.S. EPR FSAR Tier 2. Per SRP 14.3, Appendix A, Item IV.4.A, only the most safety-significant features require ITAAC. By having an ITAAC about the existence of the controls, the following criteria are satisfied:

SRP Section 14.3, Page 14.3-5, Item #3:

> If applicable, review the DCD for a certified design similar to the design for which certification is sought, specifically the Tier 1 information, for the purpose of using a similar approach, format, and language and for familiarity with the treatment of SSCs, the appropriate level of design detail, and other certification issues.

SRP Section 14.3, Appendix A, Page 14.3-9:

> The purpose of this appendix is to describe how previous design certification applications have implemented the requirements of Subpart B of 10 CFR Part 52, so that this information can be used as guidance for review of new design certification applications.

SRP Section 14.3 Appendix A, Page 14.3-18:

> Tier 2 contains detailed supporting information for various inspections, tests and analyses that can, and should be used to verify the Tier 1 design information and satisfy the acceptance criteria. If questions on interpretation should arise, the material in Tier 2 provides the background material and context for Tier 1 information. Tier 2 contains information reviewed by the staff, which is the basis for the staff's safety determination for the design. Therefore, the information in Tier 2 provides an acceptable means, but not the only means, of satisfying an ITAAC.

Item 8:

See the Response to Item 4.

Item 9(a):

See the Response to Item 5.

Item 9(b):

See the Response to Item 5.

Item 9(c):

See the response to Item 5. Also, in accordance with the following SRP Section 14.3 guidance, neither regulations nor Tier 2 should be referenced in Tier 1 material:

SRP Section 14.3, Appendix A, Page 14.3-17

> The use of codes and standards in Tier 1 should be minimized, with exceptions granted on a case-by-case basis. Instead, the applicable requirements from the regulations, codes or standards should be stated in Tier 1, rather than reference them.

Items 10, 11 and 12:

The purpose of U.S. EPR FSAR Tier 1 is not to provide details at the level required to perform inspections. As discussed in the Response to Item 4, these details are in U.S. EPR FSAR Tier 2 and the need for the inspectors to look at Tier 2 material for the details is repeated in the NRC Inspection Manuals as well as throughout SRP Section 14.3.

FSAR Impact:

U.S. EPR FSAR Tier 1, Sections 2.8.1.2.2 and 2.8.1.2.5, and Table 2.8.1-3, and Tier 2, Figure 1.2-37 and Figure 3B-1 will be revised as described in the response and indicated on the enclosed markup.

Figure 14.03.07-36-1—Low-Trajectory Turbine Missile Strike Zone

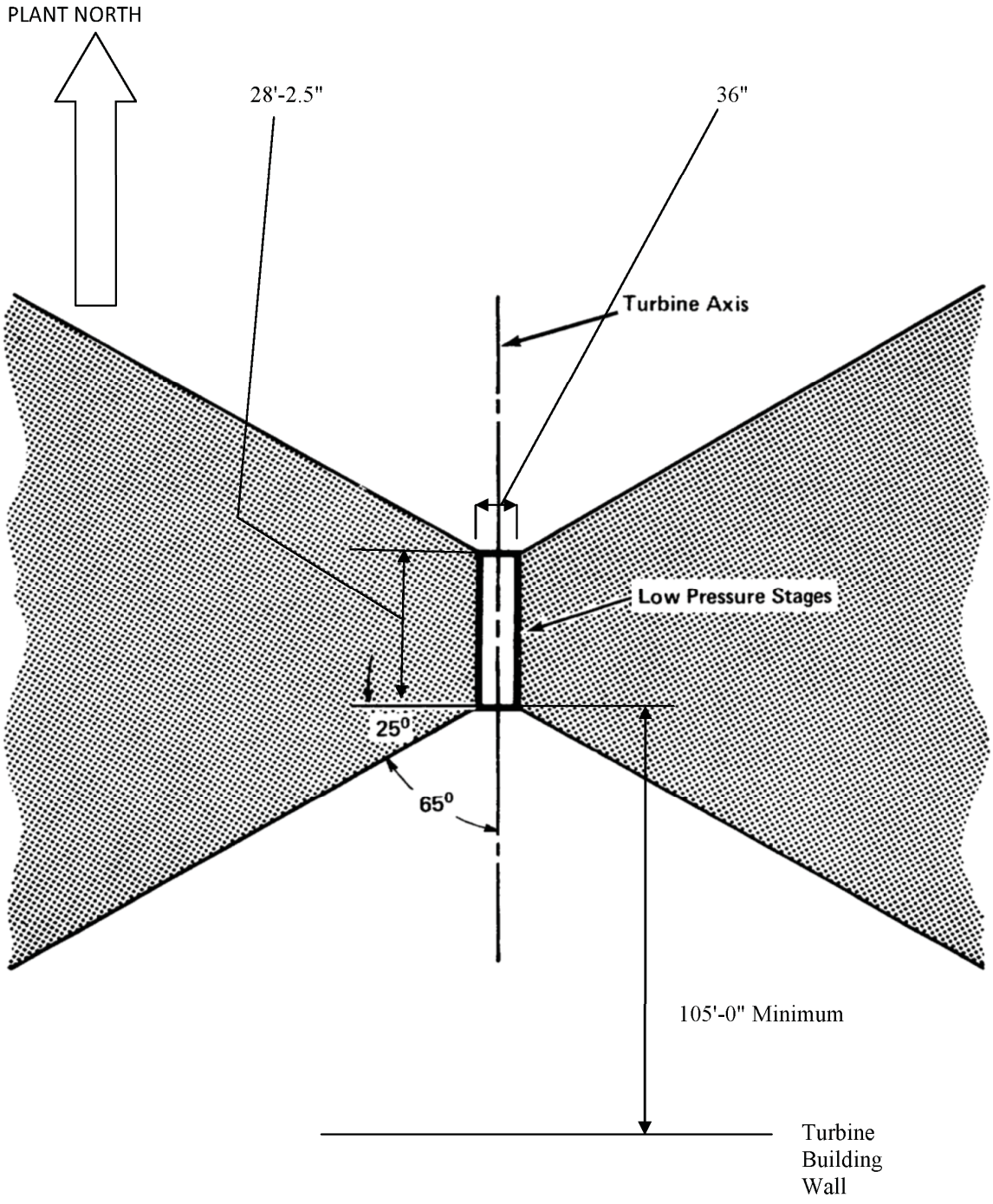
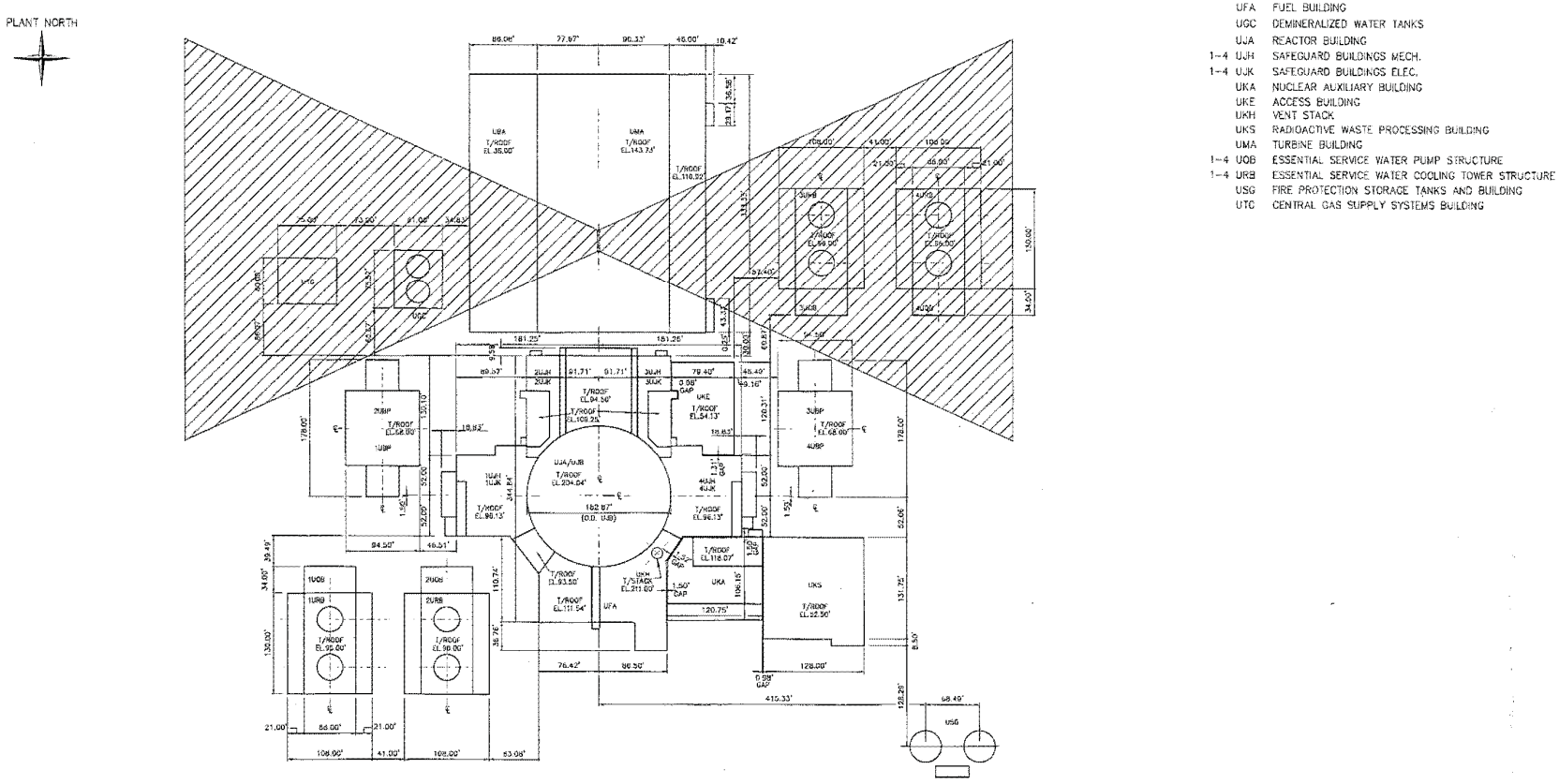


Figure 14.03.07-36-2—Turbine Location and Relationship to Site Buildings and Structures



U.S. EPR Final Safety Analysis Report Markups

2.8 Steam and Power Conversion Systems

2.8.1 Turbine-Generator System

Design Description

1.0 System Description

The turbine-generator system is a non-safety-related system that converts the energy of the steam produced in the steam generators into mechanical shaft power and then into electrical energy.

The flow of steam is directed from the steam generators to the turbine through the main steam system, turbine stop valves, and turbine control valves. After expanding through the turbine, which drives the main generator, exhaust steam is transported to the main condenser.

Turbine overspeed control is provided by two independent, redundant and diverse backup electrical turbine overspeed protection systems, in addition to the normal speed control function. The primary and backup overspeed protection systems are included to minimize the possibility of turbine rotor failure and turbine missile generation.

Turbine rotor components, and turbine stop and control valves, will be periodically tested to meet the manufacturer's turbine missile generation probability requirements.

2.0 Arrangement

2.1 The functional arrangement of the turbine generator system is as described in the Design Description of Section 2.8.1, Tables 2.8.1-1—Turbine Generator System Equipment Mechanical Design and 2.8.1-2—Turbine Generator System Equipment I&C and Electrical Design, and as shown in Figure 2.8.1-1—Turbine-Generator System Basic Configuration.

2.2 The axis of the turbine rotor shafts is positioned ~~favorable to the Reactor Building and other essential~~ such that safety related structures, except for two of the four Essential Service Water Buildings ~~and the two Emergency Power Generating Buildings, such that the safety-related structures~~ are located outside the turbine missile low trajectory hazard zone. The low-trajectory hazard zone is defined as an area bounded by lines that are inclined at 25 degrees to the turbine wheel planes and pass through the end wheels of the low pressure stages.

2.3 Deleted.

2.4 Turbine rotor integrity is provided through the combined use of selected materials with suitable toughness, analyses, testing, and inspections.

2.5 The probability of turbine material and overspeed related failures resulting in external turbine missiles is < $1x10^{-54}$ per turbine year.

3.0 I&C Design Features, Displays, and Controls

3.1 Controls on the PICS operator workstations in the main control room (MCR) trip the turbine-generator.

3.2 The turbine generator has diverse and independent overspeed protection systems.

4.0 Electrical Power Design Features

4.1 Turbine stop valves and turbine control valves listed in Table 2.8.1-1 fail closed on loss of power.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.8.1-3 lists the turbine-generator system ITAAC.

Indicated changes associated with response to RAI 439, Question 14.03.07-36

Table 2.8.1-3—Turbine-Generator System ITAAC
Sheet 1 of 3

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the turbine generator system is as described in the Design Description of Section 2.8.1, Tables 2.8.1-1 and 2.8.1-2, and as shown on Figure 2.8.1-1.	An inspection of the as-built turbine generator system functional arrangement will be performed.	The turbine generator system conforms to the functional arrangement as described in the Design Description of Section 2.8.1, Tables 2.8.1-1 and 2.8.1-2, and as shown on Figure 2.8.1-1.
2.2	The axis of the turbine rotor shafts is positioned ~~favorable to the Reactor Building and other essential~~ such that safety related structures, except for two of the four Essential Service Water Buildings ~~and the two Emergency Power Generating Buildings~~, ~~such that the safety-related structures~~ are located outside the turbine missile low trajectory hazard zone. The low-trajectory hazard zone is defined as an area bounded by lines that are inclined at 25 degrees to the turbine wheel planes and pass through the end wheels of the low pressure stages.	An inspection of the ~~as-built~~ location of the axis of the turbine rotor shafts, with respect to ~~will be performed to verify that~~ safety-related structures will be performed., ~~except for two of the four Essential Service Water Buildings and two of the four Emergency Power Generating Buildings, are located outside the turbine low trajectory hazard zone.~~	Safety-related structures, except for two of the four Essential Service Water Buildings ~~and the two Emergency Power Generating Buildings,~~ are located outside the turbine missile low trajectory hazard zone.
2.3	Deleted.	Deleted.	Deleted.

Indicated changes associated with response to RAI 439, Question 14.03.07-36

Table 2.8.1-3—Turbine-Generator System ITAAC
Sheet 2 of 3

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.4	Turbine rotor integrity is provided through the combined use of selected materials with suitable toughness, analyses, testing, and inspections.	A plant-specific analysis will be conducted of the as-built turbine rotor material property data, turbine rotor and blade design, and inspection and testing requirements.	An analysis concludes that the plant specific turbine rotor meets the requirements of the manufacturer's turbine missile probability analysis: (1) turbine material property data, rotor and blade design analyses (including loading combinations, assumptions and warm-up time) demonstrating safety margin to withstand loadings from overspeed events, and (2) the results of inspection and testing, and the requirements for inservice inspection and testing.
2.5	The probability of turbine material and overspeed related failures resulting in external turbine missiles is < $1x10^{-5}$ per turbine year.	A material and overspeed failures analysis will be performed on the as-built turbine design.	An analysis concludes that the probability of turbine material and overspeed related failures resulting in external turbine missiles is < $1x10^{-5}$ per turbine year.
3.1	Controls on the PICS operator workstations in the MCR trip the turbine-generator.	Tests will be performed using controls on the PICS operator workstations in the MCR.	Controls on the PICS operator workstations in the MCR trip the turbine-generator.

Indicated changes associated with response to RAI 439, Question 14.03.07-36

Figure 1.2-37—[[Turbine Building General Arrangement Plan View Elevation +65'-0" with Equipment]]

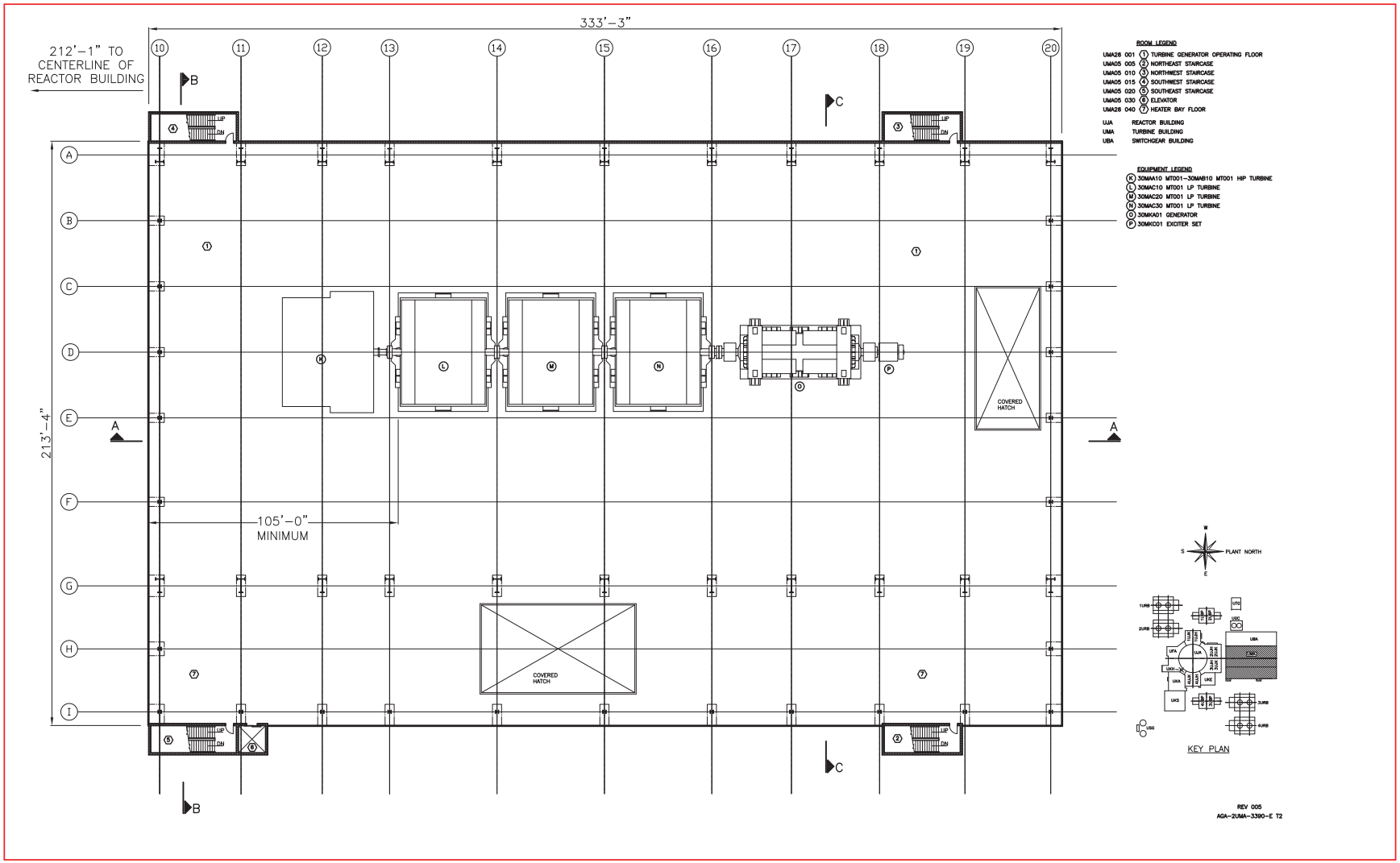


Figure 3B-1—Dimensional Arrangement Reference Plant Building Location