ArevaEPRDCDocsPEm Resource

From: KOWALSKI David (AREVA) [David.Kowalski@areva.com]
Sent: Friday, June 20, 2014 5:10 PM
To: Hearn, Peter
Cc: Eudy, Michael; 'George.Wunder@nrc.gov'; RYAN Tom (AREVA); HOTTLE Nathan (AREVA); GUCWA Len (EXTERNAL AREVA)
Subject: RE: Areva Chapter 10 Non-RAI Changes
Attachments: Chapter 10 Changes for Rev 7 Supplement 1.pdf

Peter:

Please find attached additional FSAR Chapter 10 changes that need to be included with the package of FSAR changes originally submitted to the NRC staff on June 12, 2014. The attachment contains minor revisions to the following two sections of the FSAR:

- Tier 1, Sections 2.8.2 and 2.8.6, and
- Tier 2, Section 10.4.7.

The FSAR Chapter 10 changes will be discussed with the NRC staff during a Public Telecon scheduled for June 23, 2014.

Please call me if you have any questions or require additional information. Thank-you.

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Subject: RE: Areva Chapter 10 Non-RAI Changes
Importance: High

Hello Peter.

Thank you for providing AREVA with these Chapter 10 talking points. I also want to inform you that we are planning on sending you this afternoon additional FSAR changes involving minor revisions to the following two sections of the FSAR:

- Tier 1, Sections 2.8.2 and 2.8.6, and
- Tier 2, Section 10.4.7.

These changes are currently being finalized and will be submitted to the NRC staff as soon as possible. Thank-you.

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Cc: Eudy, Michael
Subject: FW: Areva Chapter 10 Non-RAI Changes

Below are The Chapter 10 talking points for Monday's call.

Pete

The table below provides BOP branch feedback on some of the proposed changes to EPR Chapter 10 information. The staff would like the applicant to briefly go over all the Chapter 10 changes so we have a complete understanding of the changes proposed, the reason for the changes, and the impact of the changes (if any). The table below focus on some areas that the staff would like the applicant to provide more information on, or provide clarification of the information provided. The BOP branch do not have responsibility for Chapter 3 information, therefore, Projects should make sure to provide that information (markups to tables in FSAR Chapter3) to the appropriate responsible review branch.

EPR = Revision 7, Chapter 10 Non-RAI Changes – Topics for Discussion (Balance of Plant)

Affected Section	Change	Staff Feedback
10.2.4	Reworded T.G. design requirements based on discussion in Section 3.5.1.3	The applicant indicates that the change identified for Section 10.2.4 is and is consistent with the discussion in FSAR Section 3.5.1.3 and in t 109. While, this may be true, and the staff has determined that adequ provide because of redundancy, two ESBWs will not be affect, and th continue to accomplished even if the non-protected ESBWs are affec The revised text (second paragraph in section 10.2.4) seem to indica TG will could not effect SSCs important to safety, however as indicate of the paragraph, two of the four ESWBs may be affected, and since water system is important to safety the second sentence contradicts t appears not to be true.
10.3.3	On page 10.3-11 the bullet describing how safety-related	The original bullet seems to indicate that Heavy loads drops on safety the MSSS are precluded during operations requiring the MSSS to be

	portions of the MSSS were revised. Previously it was indicated that "Heavy loads drops on safety-related portions of the MSSS are precluded during operations requiring the MSSS to be operable" the revised text only states that the safety-related portions of the MSSS are protected from load drops by means used to reduce the consequences of load handling incidents.	revised bullet seems to indicate that protection is achieved by reduce change needs to be explained and justified. Is heavy load handling al operation, and are loads handled near safety related portions of the M single-failure proof cranes without interlocks to prevent movement ov portions of the MSSS.
Table 10.3-4	In Table 10.3-4, sheet 1, The last comment concerning the MSSVs is changed. The word residual is removed, and additional text about venting steam to the atmosphere is added.	In section 10.3.1 "Design Bases"" on page 10.3-1 of the FSAR the s that during accident conditions the MSSS provide initial residual heat steam to the atmosphere via the MSSV and the MSRT, Why is the wo deleted in Table 10.3-4
10.4.2	Section 10.4.4.2.3 introduced a conforming change – if TBS is not available cooldown is accomplished by MSRTs (and not by MSSVs)	This change contradicts information in Section 10.3.2.3.3 "Plant Shut that " during shutdown, all four steam trains are in operation with stea SGs either dumped to the man condenser via the turbine bypass, or t the MSRTs or MSSVs (or both)
10.4.9	In section 10.4.9.2.3.3 and 10.4.9.3 Change time of operator response/action from "within 30 minutes" to "after 30 minutes." To be consistent with chapter 15 analysis since no operator action credited before 30 minutes.	The original wording supports the chapter 15 assumptions, which con latest time at which the action will be taken (30 minutes).
10.4.9	In section 10.4.9.3 The water Inventory required for or EFW based on SBO analysis is revised down from 166, 000 gallons to 144, 000 gallons	The 166,000 gallons was provided to the staff in the response to RAI based on the EFWS providing the necessary flow for decay heat rem in hot standby conditions for eight hours. The staff originally verified t value. Since no changes in the decay heat , or amount of time at hot needs to explain the how the new volume was determined and why it operation.
10.4.9	EFWS Unreliability Results (Table 10.4.9-5) were revised and one case was eliminated	The Applicant should discuss the changes to analysis and results

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Non-RAI Changes for U. S. EPR FSAR Chapter 10, Revision 7 (Sup 1)

For Discussion Purposes Only

June 23, 2014

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Tier 1, Steam and Power Conversion

- Tier 1 Section 2.8.2, Main Steam System (MSS)
  - Subsection 1.0, System Description:
    - Corrected the description to state that MSS is a non-safety related systems with portion that are safety-related
  - Subsection 2.0, Arrangement:
    - Reworded the description to state that the physical separation between divisions of the safety-related portions of MSS equipment is listed in Table 2.8.2-2, MSS Equipment I&C and Electrical Design
  - Table 2.8.2-2, MSS Equipment I&C and Electrical Design:
    - Added a new note on the table to reference that the functional description of Safeguard Buildings is described in Section 2.1.1.2, Safeguards Buildings
  - Table 2.8.2-3, Main Steam System ITAAC:
    - Reworded ITAAC Item 2.3 to match the change to Subsection 2.0 above

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2.8.2 Main Steam System

Design Description

1.0 System Description

The main steam system (MSS) is a non-safety-related system with portions that are safety-related. It transports steam from the steam generators to the turbine generator during normal operations. The MSS also isolates the steam generators and the safety-related portion of MSS from the non-safety-related portion during design basis accidents. The main steam pipe lines from the steam generators to and including the fixed seismic restraints downstream of the main steam isolation valves (MSIVs) are safety related. The main steam lines downstream of the fixed seismic restraints to the turbine generator are non-safety-related.

The MSS provides the following safety-related functions:

- The MSS isolates the steam generators and associated portion of main steam lines.
- The MSS provides residual heat removal by venting steam to the atmosphere via the main steam relief trains (MSRTs) and the main steam safety valves (MSSVs).

The MSS provides the following non-safety-related functions:

- The MSS and the turbine bypass system provide the capability to dump steam to the main condenser.

2.0 Arrangement

2.1 The functional arrangement of the MSS is as described in the Design Description of Section 2.8.2, Tables 2.8.2-1—MSS Equipment Mechanical Design and 2.8.2-2—MSS Equipment I&C and Electrical Design, and as shown on Figure 2.8.2-1—MSS Functional Arrangement.

2.2 Deleted.

2.3 Physical separation exists between divisions of the safety-related portions of the MSS ~~as shown on Figures 2.1.1-23, 2.1.1-24, 2.1.1-36, and 2.1.1-37~~equipment as listed in Table 2.8.2-2.

3.0 Mechanical Design Features

3.1 Valves listed in Table 2.8.2-1 will be functionally designed and qualified such that each valve is capable of performing its intended function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.

3.2 Deleted.

Table 2.8.2-2—MSS Equipment I&C and Electrical Design
Sheet 1 of 5

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Main Steam Relief Isolation Valve	30LBA13AA001	Safeguard Building 1	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Open-Close/ Open-Close
Main Steam Relief Isolation Valve	30LBA23AA001	Safeguard Building 1	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Open-Close/ Open-Close
Main Steam Relief Isolation Valve	30LBA33AA001	Safeguard Building 4	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Open-Close/ Open-Close
Main Steam Relief Isolation Valve	30LBA43AA001	Safeguard Building 4	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Open-Close/ Open-Close
Main Steam Relief Control Valve	30LBA13AA101	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Open-Throttle-Close/ Open-Throttle-Close
Main Steam Relief Control Valve	30LBA23AA101	Safeguard Building 1	2^N 1^A	Yes	Yes	Position / Position	Open-Throttle-Close/ Open-Throttle-Close
Main Steam Relief Control Valve	30LBA33AA101	Safeguard Building 4	3^N 4^A	Yes	Yes	Position / Position	Open-Throttle-Close/ Open-Throttle-Close
Main Steam Relief Control Valve	30LBA43AA101	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Open-Throttle-Close/ Open-Throttle-Close
MSIV	30LBA10AA002	Safeguard Building 1	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Close / Close
MSIV	30LBA20AA002	Safeguard Building 1	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Close / Close

Table 2.8.2-2—MSS Equipment I&C and Electrical Design
Sheet 2 of 5

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
MSIV	30LBA30AA002	Safeguard Building 4	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Close / Close
MSIV	30LBA40AA002	Safeguard Building 4	1^N, 2^N, 3^N, 4^N 2^A,1^A, 4^A, 3^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Isolation Valve	30LBA14AA001	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Isolation Valve	30LBA24AA001	Safeguard Building 1	2^N 1^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Isolation Valve	30LBA34AA001	Safeguard Building 4	3^N 4^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Isolation Valve	30LBA44AA001	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Control Valve	30LBA14AA101	Safeguard Building 1	3^N 4^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Control Valve	30LBA24AA101	Safeguard Building 1	4^N 3^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Control Valve	30LBA34AA101	Safeguard Building 4	1^N 2^A	Yes	Yes	Position / Position	Close / Close
Main Steam Warming Control Valve	30LBA44AA101	Safeguard Building 4	2^N 1^A	Yes	Yes	Position / Position	Close / Close

Table 2.8.2-2—MSS Equipment I&C and Electrical Design
Sheet 3 of 5

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Main Steam Drain Isolation Valves	30LBA10AA441	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA10AA442	Safeguard Building 1	4^N 3^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA10AA444	Safeguard Building 1	3^N 4^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA20AA441	Safeguard Building 1	2^N 1^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA20AA442	Safeguard Building 1	3^N 4^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA20AA444	Safeguard Building 1	4^N 3^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA30AA441	Safeguard Building 4	3^N 4^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA30AA442	Safeguard Building 4	2^N 1^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA30AA444	Safeguard Building 4	1^N 2^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA40AA441	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Close / Close

Table 2.8.2-2—MSS Equipment I&C and Electrical Design
Sheet 4 of 5

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Main Steam Drain Isolation Valves	30LBA40AA442	Safeguard Building 4	1^N 2^A	Yes	Yes	Position / Position	Close / Close
Main Steam Drain Isolation Valves	30LBA40AA444	Safeguard Building 4	2^N 1^A	Yes	Yes	Position / Position	Close / Close
Instruments							
Main Steam Line Pressure Transmitter	30LBA10CP811	Safeguard Building 1	1^N 2^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA10CP821	Safeguard Building 1	2^N 1^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA10CP831	Safeguard Building 1	3^N 4^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA10CP841	Safeguard Building 1	4^N 3^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA20CP811	Safeguard Building 1	1^N 2^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA20CP821	Safeguard Building 1	2^N 1^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA20CP831	Safeguard Building 1	3^N 4^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA20CP841	Safeguard Building 1	4^N 3^A	Yes	N/A	Pressure/ Pressure	N/A / N/A

Table 2.8.2-2—MSS Equipment I&C and Electrical Design
Sheet 5 of 5

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Main Steam Line Pressure Transmitter	30LBA30CP811	Safeguard Building 4	1^N 2^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA30CP821	Safeguard Building 4	2^N 1^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA30CP831	Safeguard Building 4	3^N 4^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA30CP841	Safeguard Building 4	4^N 3^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA40CP811	Safeguard Building 4	1^N 2^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA40CP821	Safeguard Building 4	2^N 1^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA40CP831	Safeguard Building 4	3^N 4^A	Yes	N/A	Pressure/ Pressure	N/A / N/A
Main Steam Line Pressure Transmitter	30LBA40CP841	Safeguard Building 4	4^N 3^A	Yes	N/A	Pressure/ Pressure	N/A / N/A

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

2. ^{N} denotes the division equipment is normally powered from; ^{A} denotes the division equipment is powered from when alternate feed is implemented.

3. The functional description of Safeguard Buildings is described in Section 2.1.1.2.

Table 2.8.2-3—Main Steam System ITAAC
Sheet 1 of 7

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the MSS is as described in the Design Description of Section 2.8.2, Tables 2.8.2-1 and 2.8.2-2, and as shown on Figure 2.8.2-1.	An inspection of the as-built MSS functional arrangement will be performed.	The MSS conforms to the functional arrangement as described in the Design Description of Section 2.8.2, Tables 2.8.2-1 and 2.8.2-2, and as shown on Figure 2.8.2-1.
2.2	Deleted.	Deleted.	Deleted.
2.3	Physical separation exists between divisions of the safety-related portions of the MSS equipment as ~~shown on Figures 2.1.1-23, 2.1.1-24, 2.1.1-36, and 2.1.1-37.~~listed in Table 2.8.2-2.	An inspection will be performed to verify that the as-built safety-related portions of the MSS are located in separate valve rooms in Safeguard Buildings 1 and 4.	The divisions of the safety-related portions of the MSS are located in separate valve rooms in Safeguard Buildings 1 and 4 as listed in Table 2.8.2-2.~~shown on Figures 2.1.1-23, 2.1.1-24, 2.1.1-36, and 2.1.1-37.~~
3.1	Valves listed in Table 2.8.2-1 will be functionally designed and qualified such that each valve is capable of performing its intended function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.	Tests or type tests of valves will be performed to demonstrate that the valves function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.	A report concludes that the valves listed in Table 2.8.2-1 are capable of performing their intended function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.
3.2	Deleted.	Deleted.	Deleted.

Tier 1, Steam and Power Conversion

- Tier 1 Section 2.8.6, Main Feedwater System (MFWS)
  - Subsection 2.0, Arrangement:
    - Reworded the description to state that the physical separation between divisions of the safety-related portions of MFWS equipment is listed in Table 2.8.6-2, MFWS Equipment I&C and Electrical Design
  - Table 2.8.6-2, MFWS Equipment I&C and Electrical Design:
    - Added a new note on the table to reference that the functional description of Safeguard Buildings is described in Section 2.1.1.2, Safeguards Buildings
  - Table 2.8.6-3, Main Feedwater System ITAAC:
    - Reworded ITAAC Item 2.3 to match the change to Subsection 2.0 above

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2.8.6 Main Feedwater System

Design Description

1.0 System Description

The main feedwater system (MFWS) is a non-safety-related system with portions that are safety related. It transports and controls feedwater from the deaerator/feedwater storage tank to the steam generators (SG). It includes the startup/shutdown feedwater supply. The MFWS is safety related from the connections to the SGs to the fixed seismic restraint in each main feedwater line and to the fixed seismic restraint in each startup/shutdown feedwater line.

The MFWS provides the following safety-related function:

- Shut off main feedwater supply and startup/shutdown feedwater supply.

The MFWS provides the following non-safety-related functions:

- The MFWS supplies feedwater to the SGs for power operation.
- A startup/shutdown system supplies feedwater to the SGs for low-power operation.

2.0 Arrangement

2.1 The functional arrangement of the MFWS is as described in the Design Description of Section 2.8.6, Tables 2.8.6-1—MFWS Equipment Mechanical Design and 2.8.6-2—MFWS Equipment I&C and Electrical Design, and as shown on Figure 2.8.6-1—MFWS Functional Arrangement.

2.2 Deleted.

2.3 Physical separation exists between divisions of the safety-related portions of the MFWS equipment as ~~shown on Figures 2.1.1-23 and 2.1.1-36~~listed in Table 2.8.6-2.

3.0 Mechanical Design Features

3.1 Valves listed in Table 2.8.6-1 will be functionally designed and qualified such that each valve is capable of performing its intended function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.

3.2 Check valves listed in Table 2.8.6-1 will function to change position as listed in Table 2.8.6-1 under normal operating conditions.

3.3 Deleted.

3.4 Equipment identified as Seismic Category I in Table 2.8.6-1 can withstand seismic design basis loads without a loss of safety function(s).

Table 2.8.6-2—MFWS Equipment I&C and Electrical Design
Sheet 1 of 2

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Main Feedwater Full Load Isolation Valves (MFWFLIV)	30LAB60AA001	SB 1	3^N, 1^N 4^A, 2^A	Yes	Yes	Position / Position	Close / Close
	30LAB70AA001	SB 1	4^N, 2^N 3^A, 1^A				
	30LAB80AA001	SB 4	1^N, 3^N 2^A, 4^A				
	30LAB90AA001	SB 4	2^N, 4^N 1^A, 3^A				
Main Feedwater Full Load Control Valves (MFWFLCV)	30LAB60AA101	SB 1	1^N, 2^A	Yes	Yes	Position / Position	Close / Close
	30LAB70AA101	SB 1	2^N, 1^A				
	30LAB80AA101	SB 4	3^N, 4^A				
	30LAB90AA101	SB 4	4^N, 3^A				
Main Feedwater Isolation Valves (MFWIV)	30LAB60AA002	SB 1	1^N, 2^A	Yes	Yes	Position / Position	Close / Close
	30LAB70AA002	SB 1	2^N, 1^A				
	30LAB80AA002	SB 4	3^N, 4^A				
	30LAB90AA002	SB 4	4^N, 3^A				

Table 2.8.6-2—MFWS Equipment I&C and Electrical Design
Sheet 2 of 2

Description	Tag Number(1)	Location(3)	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Main Feedwater Low Load Isolation Valves (MFWLLIV)	30LAB64AA001	SB 1	$3^N, 4^A$	Yes	Yes	Position / Position	Close / Close
	30LAB74AA001	SB 1	$4^N, 3^A$				
	30LAB84AA001	SB 4	$1^N, 2^A$				
	30LAB94AA001	SB 4	$2^N, 1^A$				
Main Feedwater Low Load Control Valves (MFWLLCV)	30LAB64AA101	SB 1	$1^N, 2^A$	Yes	Yes	Position / Position	Close / Close
	30LAB74AA101	SB 1	$2^N, 1^A$				
	30LAB84AA101	SB 4	$3^N, 4^A$				
	30LAB94AA101	SB 4	$4^N, 3^A$				
Main Feedwater Very Low Load Control Valves (MFWVLLCV)	30LAB64AA102	SB 1	$1^N, 2^A$	Yes	Yes	Position / Position	Close / Close
	30LAB74AA102	SB 1	$2^N, 1^A$				
	30LAB84AA102	SB 4	$3^N, 4^A$				
	30LAB94AA102	SB 4	$4^N, 3^A$				

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

2. ^{N} denotes the division equipment is normally powered from; ^{A} denotes the division equipment is powered from when alternate feed is implemented.

3. The functional description of Safeguard Buildings is described in Section 2.1.1.2.

Table 2.8.6-3—Main Feedwater System ITAAC
Sheet 1 of 6

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the MFWS is as described in the Design Description of Section 2.8.6, Tables 2.8.6-1 and 2.8.6-2, and as shown on Figure 2.8.6-1.	An inspection of the as-built MFWS functional arrangement will be performed.	The MFWS conforms to the functional arrangement as described in the Design Description of Section 2.8.6, Tables 2.8.6-1 and 2.8.6-2, and as shown on Figure 2.8.6-1.
2.2	Deleted.	Deleted.	Deleted.
2.3	Physical separation exists between divisions of the safety-related portions of the MFWS equipment as ~~shown on Figures 2.1.1-23 and 2.1.1-36~~listed in Table 2.8.6-2.	An inspection will be performed to verify that the as-built safety-related portions of the MFWS are located in separate valve rooms in Safeguard Buildings 1 and 4.	The divisions of the safety-related portions of the MFWS are located in separate valve rooms in Safeguard Buildings 1 and 4 as ~~shown on Figures 2.1.1-23 and 2.1.1-36~~listed in Table 2.8.6-2.
3.1	Valves listed in Table 2.8.6-1 will be functionally designed and qualified such that each valve is capable of performing its intended function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.	Tests or type tests of valves will be performed to demonstrate that the valves function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.	A report concludes that the valves listed in Table 2.8.6-1 are capable of performing their intended function under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions up to and including design basis accident conditions.
3.2	Check valves listed in Table 2.8.6-1 will function to change position as listed in Table 2.8.6-1 under normal operating conditions.	Tests will be performed to verify the ability of check valves to change position under normal operating conditions.	The check valves change position as listed in Table 2.8.6-1 under normal operating conditions.
3.3	Deleted.	Deleted.	Deleted.

Tier 2, Chapter 10 Steam and Power Converion

- Section 10.4.7, Condensate and Feedwater System
  - Subsection 10.4.7.2.1, General Description:
    - Page 10.4-35: Provided further clarification and corrected the statement that describes capability of the feedwater system to limit the total system delivery rate to the steam generators
  - Subsection 10.4.7.2.3, System Operation
    - Page 10.4-39: Provided further clarification and corrected the statement that describes capability of the feedwater system to limit the total system delivery rate to the steam generators

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makeup valves are split-range. The valve station controls deaerator–feedwater storage tank level by controlling condensate flow.

Following the deaerator makeup valve station, condensate flows to the four stages of LP FWHs, three strings for stage 1 and 2 and two strings for stages 3 and 4. Each string of LP FWHs can be isolated and bypassed via manual component level controls from PICS. No automatic functions or manual group commands exist for these valves. Condensate combines with the return line from the blowdown coolers and flows to the deaerator–feedwater storage tank. Deaerator–feedwater storage tank inventory is maintained by demineralized water supply from the DWDS.

The main feedwater and startup and shutdown motor-driven feedwater pumps are located in the TB below the deaerator–feedwater storage tank. Feedwater is pumped by four 33 percent capacity MFW pumps and a single five percent capacity startup and shutdown feedwater pump. Normally three MFW pumps are in operation with the fourth main pump and the startup and shutdown pump on automatic standby. A separate line from the deaerator–feedwater storage tank supplies each feedwater pump.

Downstream of the feedwater pumps the piping combines into a common header, which supplies the two strings of HP FWHs and reheater stage 2 drain coolers. Each string can be isolated and bypassed via manual component level controls from PICS. No automatic functions or manual group commands exist for these valves.

Downstream of the HP FWH trains, the MFW line splits into individual feed lines to each of the four SGs. The feedwater system is designed to limit total system delivery rate to the Steam Generators to 115%~~, assuming inadvertent operation of the standby main feedwater pump and that four MFW pumps are operating~~ of flow at 100% load in the event that all four full load control valves are opened due to a PAS/PICS failure. The feed lines are routed outdoors along a pipe bridge, through the SB and into the RB via the four containment penetrations. The feedwater valve stations are located inside compartments within valve rooms inside the SBs, and are split-range to improve controllability over the entire operating range. Each valve station contains a full load control valve with an upstream hydraulic-pneumatic feedwater full load isolation valve and a low load and very low load control valve with a common upstream motor-operated low load feedwater isolation valve (MFWLLIV).

A motor-operated main feedwater isolation valve (MFWIV) is provided just outside the RB. Additionally, a damped check valve inside the RB provides additional containment isolation. Piping from the valve stations to the SG is routed upward without loops to preclude steam plugging during transients. Refer to Section 5.4.2 for a description of the feedwater connection to each SG.

condenser circulating water pumps, part of the circulating water system (CWS), are operating to remove heat loads from the condenser.

Using one condensate pump during recirculation, the system is vented and pressurized in stages. Turbine sealing may begin once condensate flow is established through the gland steam condenser. Similarly, SG blowdown begins once condensate flow is established through the blowdown cooler. Once water is admitted to the deaerator–feedwater storage tank, the low range makeup valve automatically maintains deaerator–feedwater storage tank level.

At approximately 50 percent load, a second condensate pump is started to maintain flow. The condensate pump recirculation valve gradually modulates closed as the unit load is increased.

Using the startup and shutdown feedwater pump, its recirculation valve automatically modulates to maintain pump minimum flow and the main feedwater very low load control valves (MFWVLLCV) automatically modulate to maintain SG water level. At approximately five percent load, one of the MFW pumps is started, as required to maintain SG water level. Subsequently, the second and third MFW pumps are started. The feedwater pumps are started in a staged manner to reduce the possibility of overfeed in the event of controls malfunctioning.

As load is increased, flow control is transferred from the MFWVLLCVs, to the MFWLLCVs and eventually to the MFWFLCVs.

Normal Operation

During normal plant operation, two condensate pumps are in service with flow from the hotwell, through the gland steam condenser LP FWHs, and blowdown cooler into the deaerator–feedwater storage tank. Normally, there is no flow to the turbine bypass or exhaust hood sprays. The standby condensate pump is normally set to automatically start on failure of an operating pump.

During normal operation, three MFW pumps are in service with flow from the deaerator–feedwater storage tank, through the HP FWHs and second stage reheater drain coolers, and into the SG. The standby MFW pump is normally set to automatically start on failure of an operating pump. The startup and shutdown feedwater pump is normally set to start on failure of all main pumps. The feedwater system is designed to limit total system delivery rate to the Steam Generators to 115%~~, assuming inadvertent operation of the standby main feedwater pump and that four MFW pumps are operating~~ of flow at 100% load in the event that all four full load control valves are opened due to a PAS/PICS failure.