RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**162-8055**
SRP Section:	**16 - Technical Specification**
Application Section:	**16.1.2**
Date of RAI Issue:	**08/20/2015**

Question No. 16-49

Rev. 0 of DCD Tier 2 Subsection 16.1.2 states: "The units specified in the APR1400 Technical Specifications are the International system of units (SI units) and the English units. The SI units have been used as the primary unit and the English units have been used in parentheses." Sections 3.3.4.a and 4.2.1.d (first sentence) of the Writer's Guide for Plant-Specific Improved Technical Specifications both contain the following guidance statement: "Units used in specifications should correlate with the units the operator reads from the instrumentation." Since a COL applicant would have to use either SI or English units, KHNP is requested to add the following: "The choice of units is a COL information item to be resolved by a COL applicant; however the TS and Bases do not enclose the parameter value pairs in square brackets. This is an exception to the use of brackets to denote COL information in the TS and Bases, as discussed below."

Response

To address the use of units as specified in the Writer's Guide for Plant Specific Improved Technical Specifications, DCD Section 16.1.2 of APR1400 Technical Specification will be revised to add a COL item noting that the COL applicant is to resolve the use of SI or English units.

Impact on DCD

Same as changes described in the Impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

DCD Section 16.1.2 will be revised as indicated in the attached markup.

Impact on Technical/Topical/Environmental Report

There is no impact on any Technical, Topical, or Environment Reports.

CHAPTER 16 – TECHNICAL SPECIFICATIONS

16.1 Introduction to Technical Specifications

16.1.1 Limiting Conditions for Operation (LCOs) Selection Criteria

The APR1400 Technical Specifications LCOs have included the structures, systems, components, and parameters which are identified by the LCO criteria of 10 CFR 50.36(c)(2)(ii) (Reference 1) as below:

a. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

b. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

c. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

d. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

16.1.2 Technical Specification Content

The content of the APR1400 Technical Specifications meets the requirements of 10 CFR 50.36. The APR1400 Technical Specifications were developed using the most appropriate guidance, NUREG-1432 Rev. 4.0 (Reference 2).

The difference between NUREG-1432 and the APR1400 Technical Specification exists only as necessary to reflect advanced design features and operational features. The units specified in the APR1400 Technical Specifications are the International system of units (SI units) and the English units. The SI units have been used as the primary unit and the English units have been used in parentheses.

The choice of units is a COL information item to be resolved by a COL applicant; however the TS and Bases do not enclose the parameter value pairs in square brackets. This is an exception to the use of brackets to denote COL information in the TS and Bases.

16.1.2.4 Combined License Information

The intention of the APR1400 Technical Specifications is to be used as a guide for the development of the plant-specific Technical Specifications for plants which will reference the standard APR1400 plant. Single brackets ([ ]) are used to identify the preliminary design information or plant-specific information. Double brackets ([[ ]]) indicate the conceptual design information for those portions of the plant for which the application does not seek certification.

16.1.3 Reference

1. 10 CFR 50.36, "Technical Specifications."

2. NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants," Rev. 4.0, April 2012.

COL 16.1(1) The choice of units is a COL information to be resolved by COL applicant

Table 1.8-2 (25 of 29)

Item No.	Description
COL 14.2(8)	The COL applicant that references the APR1400 design certification is to identify the specific operator training to be conducted as part of the low-power testing program related to the resolution of TMI Action Plan Item I.G.1, as described in (1) NUREG-0660, "NRC Action Plans Developed as a Result of the TMI-2 Accident," Revision 1, August 1980 and (2) NUREG-0737, "Clarification of TMI Action Plan Requirements."
COL 14.2(9)	The COL applicant is to prepare the pre-operational test of cooling tower and associated auxiliaries, and raw water and service water cooling systems.
COL 14.2(10)	The COL applicant is to develop the test program of personnel monitors and radiation survey instruments.
COL 14.2(11)	The COL applicant is to develop the test procedure of the communication system.
COL 14.3(1)	The COL applicant is to provide the ITAAC for the site-specific portion of the plant systems specified in Subsection 14.3.3.
COL 14.3(2)	The COL applicant is to provide the proposed ITAAC for the facility's emergency planning addressed in Subsection 14.3.2.10.
COL 14.3(3)	The COL applicant is to provide the proposed ITAAC for the facility's physical security hardware addressed in Subsection 14.3.2.12.
COL 14.3(4)	The COL applicant is to provide a DAC closure schedule for implementing the piping DAC.
COL 15.0(1)	The COL applicant is to perform the radiological consequence analysis using site-specific χ/Q values, unless the χ/Q values used in the DCD envelop the site-specific short-term or long-term χ/Q values of the DCD, and to show that the resultant doses are within the guideline values of 10 CFR 50.34 for EAB and LPZ and that of 10 CFR Part 50, Appendix A, GDC 19 for the MCR and TSC.
COL 17.4(1)	The COL applicant is to develop and implement Phases 2 and 3 of the design RAP, including QA requirements. In Phase 2, the plant's site-specific information is to be subjected to the design RAP process, and the site-specific risk-significant SSCs are combined with the APR1400 design risk-significant SSCs into one list for the plant. Phase 2 is to be performed during the COL application phase and updated/maintained during the COL license holder phase. In Phase 3, procurement, fabrication, construction, and test specifications for the SSCs within the scope of the RAP provide reasonable assurance that key assumptions, such as equipment reliability, are realistic and achievable. The QA requirements are implemented during the procurement, fabrication, construction, and pre-operational testing of the SSCs within the scope of the RAP. Phase 3 is to be performed during the COL license holder phase and prior to initial fuel loading. The COL applicant is to propose a method for incorporating the objectives of the reliability assurance program into other programs for design or operational errors that degrade non-safety-related, risk-significant SSCs.

COL 16.1(1) The choice of units is a COL information to be resolved by COL applicant

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Question No. 16-50

The applicant is requested to address the formatting of NOTES throughout the Technical Specifications (TS). These formatting issues in the TS are not in accordance with the Writer's Guide for Plant-Specific Improved Technical Specifications. Section 2.1.4.b of the Writer's Guide states the following: "If more than one issue is addressed in the Note, separate the items as ordered list (refer to Writer's Guide Section 2.1.3) and use the plural title "NOTES." Section 2.1.3.d states the following: "Include one blank line between each list component."

There are multiple occurrences of a NOTE containing multiple items and the title of the NOTE is "NOTE" versus "NOTES". Examples of these errors can be found on pages 3.1.3-2 (SR 3.1.3.1 NOTE), 3.3.1-1 (APPLICABILTY NOTE), and 3.6.2-1 (2 occurrences; the ACTIONS NOTE and the NOTE prior to REQUIRED ACTION A.1).

The applicant is requested to perform a global check of the NOTES contained in the TS to ensure that all formatting follows the guidance of the Writer's Guide, thus ensuring the text aligns with the STS. This global check should include the verifying that the proper NOTE title is being used (NOTE versus NOTES) and that a line break occurs between each listed component in the NOTE.

Response

The global check was performed to ensure that the proper NOTE title is being used and that a line break occurs between each listed component in the NOTE. The DCD will be revised following the guidance of the Writer's Guide in formatting of NOTES throughout the TS.

Impact on DCD

Same as changes described in the Impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

The following TS will be revised as indicated in the attachment: 3.1.3, 3.3.1, 3.3.2, 3.3.5, 3.3.11, 3.3.12, 3.4.6, 3.4.7, 3.4.8, 3.4.12, 3.4.13, 3.6.2, 3.6.3, 3.7.5, 3.7.7, 3.7.8, 3.8.1, and 3.8.4.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.3.1	---------- NOTES ---------- 1. The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading. 2. This Surveillance is not required to be performed prior to entry into MODE 2. ---------- Verify overall core reactivity balance is within ± 1.0 % $\Delta k/k$ of predicted values.	Prior to entering MODE 1 after fuel loading <u>AND</u> ---------- NOTE ---------- Only required after 60 EFPD ---------- 31 EFPD

3.3 INSTRUMENTATION

3.3.1 Reactor Protection System (RPS) Instrumentation – Operating

LCO 3.3.1 Four RPS trip and associated operating bypass removal channels for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1

---------- NOTES ----------

1. Separate Condition entry is allowed for each RPS Function.
2. When one channel is bypassed and the bypassed condition exceeds 7 days, whether the operation with bypass state in one channel is allowed during Completion Times identified in Required Action A.2 or C.2.2 shall be reviewed within the next 24 hours in accordance with administrative controls.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one automatic RPS trip channel inoperable.	A.1 Place channel in bypass or trip. AND A.2 Restore trip channel to OPERABLE status.	1 hour Prior to next entry into MODE 2 following entry into MODE 5
B. One or more Functions with two trip channels inoperable.	---------- NOTE ---------- Only required to be met when COLSS is out of service. With COLSS in service, LHR is continuously monitored. ---------- B.1 Place one trip channel in bypass and the other in trip.	 1 hour

SURVEILLANCE REQUIREMENTS

NOTE

Refer to Table 3.3.1-1 to determine which SR shall be performed for each RPS Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK of each RPS instrument channel.	12 hours
SR 3.3.1.2	NOTE The performance shall be completed within 12 hours after THERMAL POWER ≥ 80 % RTP. Verify total reactor coolant system (RCS) flow rate indicated by each CPC is less than or equal to the RCS total flow rate. If necessary, adjust CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to RCS flow rate.	12 hours
SR 3.3.1.3	Check CPC system event log.	12 hours
SR 3.3.1.4	NOTES 1. The performance shall be completed within 12 hours after THERMAL POWER ≥ 15 % RTP. 2. The daily calibration may be suspended during PHYSICS TESTS, provided calibration is performed upon reaching each major test power plateau and prior to proceeding to next major test power plateau. Perform calorimetric calculation and adjust linear power, CPC ΔT, and CPC neutron flux power to agree with calorimetric calculation if any of the linear power, CPC ΔT, and CPC neutron flux power is less than calorimetric calculation by more than 0.5 %.	24 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.5	---------- NOTE ---------- The performance shall be completed within 12 hours after THERMAL POWER ≥ 80 % RTP. ---------- Verify total RCS flow rate indicated by each CPC is less than or equal to RCS flow rate determined by secondary calorimetric calculations.	31 days
SR 3.3.1.6	---------- NOTE ---------- The performance shall be completed within 12 hours after THERMAL POWER ≥ 15 % RTP ---------- Verify linear power subchannel gains of excore neutron detectors are consistent with values used to establish shape annealing matrix elements in the CPCs.	31 days
SR 3.3.1.7	---------- NOTES ---------- 1. The CPC CHANNEL FUNCTIONAL TEST includes verification that correct values of addressable constants are installed in each OPERABLE CPC. 2. Not required to be performed for Logarithmic Power Level – High until 2 hours after reducing THERMAL POWER below 10^{-3} % RTP and only if reactor trip switchgears (RTSGs) are open. ---------- Perform CHANNEL FUNCTIONAL TEST for each RPS instrumentation channel in accordance with Setpoint Control Program.	31 days

3.3 INSTRUMENTATION

3.3.2 Reactor Protection System (RPS) Instrumentation – Shutdown

LCO 3.3.2 Four RPS trip and bypass removal channels for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1

ACTIONS

NOTES

1. Separate Condition entry is allowed for each RPS Function.
2. When one channel is bypassed and the bypassed condition exceeds 7 days, whether the operation with bypass state in one channel is allowed during Completion Times identified in Required Action A.2 or C.2.2 shall be reviewed within the next 24 hours in accordance with administrative controls.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one automatic RPS trip channel inoperable.	A.1 Place channel in bypass or trip. AND A.2 Restore trip channel to OPERABLE status.	1 hour Prior to next entry into MODE 2 following entry into MODE 5
B. One or more Functions with two automatic RPS trip channels inoperable.	B.1 Place one trip channel in bypass and the other in trip.	1 hour

3.3 INSTRUMENTATION

3.3.5 Engineered Safety Features Actuation System (ESFAS) Instrumentation

LCO 3.3.5 Four ESFAS trip channels and associated operating bypass removal channels for each Function in Table 3.3.5-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1.

ACTIONS

NOTES

1. Separate Condition entry is allowed for each ESFAS Function.
2. When one channel is bypassed and the bypassed condition exceeds 7 days duration, it shall be reviewed in 24 hours whether to maintain the operation in bypassed condition within the specified Completion Time of the Required Action A.2 or administrative controls.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one automatic ESFAS trip channel inoperable.	A.1 Place trip channel in bypass or trip. AND A.2 Restore trip channel to OPERABLE status.	1 hour Prior to next entry into MODE 2 following entry into MODE 5
B. One or more Functions with two trip channels inoperable.	NOTE LCO 3.0.4 is not applicable. B.1 Place one trip channel in bypass and the other in trip.	 1 hour

3.3 INSTRUMENTATION

3.3.11 Accident Monitoring Instrumentation (AMI)

LCO 3.3.11 The AMI measurement channel for each Function in Table 3.3.11-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

NOTES

1. LCO 3.0.4 is not applicable.
2. Separate condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required measurement channel inoperable.	A.1 Restore required measurement channel to OPERABLE status.	31 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.5.	Immediately
C. One or more Functions with two required measurement channels inoperable.	C.1 Restore one measurement channel to OPERABLE status.	7 days
D. Required Action and associated Completion Time of Condition C not met.	D.1 Enter Condition referenced in Table 3.3.11-1 for the channel.	Immediately

3.3 INSTRUMENTATION

3.3.12 Remote Shutdown Display and Control

LCO 3.3.12 The Remote Shutdown Display and Control Functions in Table 3.3.12-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

NOTES

1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required Functions inoperable.	A.1 Restore required Functions to OPERABLE status.	31 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops – MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of RCS loops and shutdown cooling (SC) trains shall be OPERABLE and at least one loop or train shall be in operation.

---------- NOTES ----------

1. All reactor coolant pumps (RCPs) and SC pumps may be de-energized ≤ 1 hour per 8-hour period, provided:

   a. No operations are permitted that would cause reduction of the RCS boron concentration required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 5.6 °C (10 °F) below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperatures less than or equal to the LTOP enable temperature specified in the PTLR, unless secondary side water temperature in each steam generator (SG) is < 55.6 °C (100 °F) above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop inoperable. <u>AND</u> Two SC trains inoperable.	A.1 Initiate action to restore a second loop or train to OPERABLE status.	Immediately
B. One required SC train inoperable. <u>AND</u> Two required RCS loops	B.1 Be in MODE 5.	24 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops – MODE 5 (Loops Filled)

LCO 3.4.7 One shutdown cooling (SC) train shall be OPERABLE and in operation, and either:

a. One additional SC train shall be OPERABLE, or

b. The secondary side water level of each steam generator (SG) shall be ≥ 25 % wide range indication.

---------- NOTES ----------

1. The SC pump of the train in operation may be de-energized for ≤ 1 hour per 8-hour period provided:

   a. No operations are permitted that would cause reduction of the RCS boron concentration required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 5.6 °C (10 °F) below saturation temperature.

2. One required SC train may be inoperable for up to 2 hours for surveillance testing provided that the other SC train is OPERABLE and in operation.

3. No RCP shall be started with one or more of the RCS cold leg temperatures less than or equal to the LTOP enable temperature specified in the PTLR, unless secondary water temperature of each SG is < 55.6 °C (100 °F) above each of the RCS cold leg temperatures.

4. All SC trains may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

5. A containment spray pump can be manually realigned to meet the requirement of a SC pump.

APPLICABILITY: MODE 5 with RCS loops filled.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops – MODE 5 (Loops Not Filled)

LCO 3.4.8 Two shutdown cooling (SC) trains shall be OPERABLE and one SC train shall be in operation.

---------- NOTES ----------

1. All SC pumps may be de-energized for ≤ 15 minutes when switching from one train to another provided:

   a. Core outlet temperature is maintained at least 5.6 °C (10 °F) below saturation temperature.

   b. No operations are permitted that would cause a reduction of RCS boron concentration required to meet the SDM of LCO 3.1.1; and

   c. No draining operations to further reduce RCS water volume are permitted.

2. One SC train may be inoperable for ≤ 2 hours for surveillance testing provided the other SC train is OPERABLE and in operation.

3. A containment spray pump can be manually realigned to meet the requirement of a SC pump.

APPLICABILITY: MODE 5 with RCS loops not filled.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1	----------NOTES---------- 1. Not required to be performed until 12 hours after establishment of steady state operation. 2. Not applicable to primary-to-secondary LEAKAGE. ---------- Verify RCS operational LEAKAGE is within limit by performing RCS water inventory balance.	72 hours
SR 3.4.12.2	---------- NOTE ---------- Not required to be performed until 12 hours after establishment of steady state operation. ---------- Verify primary-to-secondary LEAKAGE is ≤ 0.39 L/min (150 gpd) through any one SG.	72 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.13 Leakage from each RCS PIV shall be within limits.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the shutdown cooling (SC) flow paths when in SC operation or during the transition to or from SC operation

ACTIONS

NOTES

1. Separate Condition entry is allowed for each flow path.
2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	NOTE Each valve used to satisfy Required Actions A.1 and A.2 must have been verified to meet the Surveillance and Frequency of SR 3.4.13.1 and be on the reactor coolant pressure boundary.	
	A.1 Isolate high pressure portion of affected system from low pressure portion by use of one closed manual, deactivated automatic, or check valve.	4 hours
	AND	
	A.2 Restore RCS PIV leakage to within limit.	72 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	NOTES 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on RCS PIVs located in SC flow path when in SC mode of operation. 3. RCS PIVs actuated during performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided.	
	Verify leakage from each RCS PIV is equivalent to ≤ 1.89 L/min (0.5 gpm) per nominal 2.54 cm (1 in) of valve size up to a maximum of 18.9 L/min (5 gpm) at an RCS pressure ≥ 156.8 kg/cm^{2}A (2,230 psia) and ≤ 159.6 kg/cm^{2}A (2,270 psia).	18 months AND Prior to entering MODE 2 whenever unit has been in MODE 5 for 72 hours or more, if leakage testing has not been performed in previous 9 months AND Prior to returning valve to service following maintenance, repair, or replacement work on valve AND Within 24 hours following valve actuation due to automatic or manual action or flow through the valve

3.6 CONTAINMENT SYSTEMS

3.6.2 Containment Air Locks

LCO 3.6.2 Two Containment Air Locks shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

NOTES

1. Entry and exit are permissible to perform repairs on affected personnel lock components.
2. Separate Condition entry is allowed for each air lock.
3. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment," when leakage results in exceeding the overall containment leakage rate acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment air locks with one containment air lock door inoperable.	NOTES 1. Required Actions A.1, A.2, and A.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered. 2. Entry and exit are permissible for 7 days under administrative controls if both air locks are inoperable.	
	A.1 Verify OPERABLE door is closed in affected air lock.	1 hour
	AND	
	A.2 Lock OPERABLE door closed in affected air lock.	24 hours
	AND	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 ---------- NOTE ---------- Air lock doors in high radiation areas may be verified locked closed by administrative means. ---------- Verify OPERABLE door is locked closed in affected air lock.	Once per 31 days
B. One or more containment air locks with containment air lock interlock mechanism inoperable.	----------NOTES---------- 1. Required Actions B.1, B.2, and B.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered. 2. Entry and exit of containment are permissible under control of a dedicated individual. ----------	
	B.1 Verify an OPERABLE door is closed in affected air lock.	1 hour
	AND	
	B.2 Lock an OPERABLE door closed in affected air lock.	24 hours
	AND	
	B.3 ---------- NOTE ---------- Air lock doors in high radiation areas may be verified locked closed by administrative means. ---------- Verify OPERABLE door is locked closed in affected air lock.	Once per 31 days

3.6 CONTAINMENT SYSTEMS

3.6.3 Containment Isolation Valves

LCO 3.6.3 Each containment isolation valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

NOTES

1. Penetration flow paths (except for 1219.2 mm (48 in) purge valve penetration flow paths) may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for system(s) made inoperable by containment isolation valves.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment," when leakage results in exceeding the overall containment leakage rate acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. NOTE Only applicable to penetration flow paths with two or more containment isolation valves. One or more penetration flow paths with one containment isolation valve inoperable (except for purge valve leakage not within limit).	A.1 Isolate affected penetration flow path by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	4 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 ----------NOTES---------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ---------- Verify affected penetration flow path is isolated.	Once per 31 days for isolation device outside containment <u>AND</u> Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation device inside containment
B. ---------- NOTE ---------- Only applicable to those penetration flow paths with two or more containment isolation valves. ---------- One or more penetration flow paths with two containment isolation valves inoperable (except for purge valve leakage not within limit).	B.1 Isolate affected penetration flow path by use of at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ---------- NOTE ---------- Only applicable to those penetration flow paths with only one containment isolation valve and a closed system. ---------- One or more penetration flow paths with one containment isolation valve inoperable	C.1 Isolate affected penetration flow path by use of at least one closed and deactivated automatic valve, closed manual valve, or blind flange. AND C.2 ---------- NOTE ---------- Isolation devices in high radiation areas may be verified by use of administrative means. ---------- Verify affected penetration flow path is isolated.	4 hours Once per 31 days
D. One or more penetration flow paths with one or more containment purge valves not within purge valve leakage limits	D.1 Isolate affected penetration flow path by use of at least one closed and deactivated automatic valve with resilient seals, closed manual valve with resilient seals, or blind flange. AND D.2 ---------- NOTES ---------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ---------- Verify affected penetration flow path is isolated.	24 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.5.3	----------NOTES---------- a. Not required to be performed for turbine driven AFW pump until 24 hours after reaching 69.25 kg/cm^{2}G (985 psig) in steam generators. b. Not required to be met in MODE 4 when steam generator is relied upon for heat removal. ---------- Verify each AFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to correct position on an actual or simulated actuation signal.	18 months
SR 3.7.5.4	----------NOTES---------- a. Not required to be performed for turbine driven AFW pump until 24 hours after reaching 69.25 kg/cm^{2}G (985 psig) in steam generators. b. Not required to be met in MODE 4 when steam generator is relied upon for heat removal. ---------- Verify each AFW pump starts automatically on an actual or simulated actuation signal when in MODE 1, 2, or 3.	18 months
SR 3.7.5.5	Verify proper alignment of required AFW flow paths by verifying flow from auxiliary feedwater storage tank to each steam generator.	Prior to entering MODE 2 whenever a unit has been in MODE 5, 6, or defueled for a cumulative period of > 30 days.

3.7 PLANT SYSTEMS

3.7.7 Component Cooling Water System (CCWS)

LCO 3.7.7 Two CCW divisions shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CCW division inoperable.	----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources – Operating," for emergency diesel generator made inoperable by CCW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4," for shutdown cooling made inoperable by CCW. ---------- A.1 Restore CCW division to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

3.7 PLANT SYSTEMS

3.7.8 Essential Service Water System (ESWS)

LCO 3.7.8 Two ESWS divisions shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESWS division inoperable.	----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources – Operating," for emergency diesel generator made inoperable by ESWS. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4" for shutdown cooling made inoperable by ESWS. ---------- A.1 Restore ESWS division to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each offsite circuit.	7 days
SR 3.8.1.2	----------NOTES---------- 1. All EDG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 2. A modified EDG start, involving idling and gradual acceleration to synchronous speed, may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each EDG starts from standby conditions and achieves steady state voltage ≥ 3,744 V and ≤ 4,576 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days
SR 3.8.1.3	----------NOTES---------- 1. EDG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one EDG at a time. 4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ---------- Verify each EDG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 90 % rating and ≤ 100 % rating.	31 days
SR 3.8.1.4	Verify each day tank contains ≥ 2,404 L (635 gal) of fuel oil.	31 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.5	Check for and remove accumulated water from each day tank and engine mounted tank.	31 days
SR 3.8.1.6	Verify fuel oil transfer system operates to automatically transfer fuel oil from storage tank to the day tank.	92 days
SR 3.8.1.7	----------NOTES---------- 1. EDG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one EDG at a time. 4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ---------- Verify each EDG starts from standby condition and achieves: a. In ≤ 17 seconds, voltage ≥ 3,744 V and frequency ≥ 58.8 Hz and b. Steady stage voltage ≥ 3,744 V and ≤ 4,576 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.8	---------- NOTE ---------- [This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events which satisfy this SR.] ---------- Verify automatic and manual transfer of AC power sources from the normal offsite circuit to each alternate offsite circuit.	18 months
SR 3.8.1.9	---------- NOTES ---------- 1. [This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.] 2. [If performed with the EDG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.] ---------- Verify each EDG rejects a load greater than or equal to its associated single largest post-accident load and: a. Following load rejection, the frequency is ≤ 63 Hz, b. Within 3 seconds following load rejection, the voltage is ≥ 3,744 V and ≤ 4,576 V, and c. Within 3 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	----------NOTES---------- [1. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.] 2. If performed with EDG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ----------	
	Verify each EDG does not trip, and voltage is maintained ≤ 4,576 V during and following a load rejection of ≥ 90 % rating and ≤ 100 % rating.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	----------NOTES---------- 1. All EDG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses, b. Load shedding from emergency buses, c. EDG auto-starts from standby condition, and: 1. Energizes permanently-connected loads in ≤ 19 seconds, 2. Energizes auto-connected shutdown loads through automatic load sequencer, 3. Maintains steady state voltage ≥ 3,744 V and ≤ 4,576 V, 4. Maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. Supplies permanently connected and auto-connected shutdown connected loads for ≥ 5 minutes.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	----------NOTES---------- 1. [All EDG starts may be preceded by an engine prelube period.] 2. [This Surveillance shall not be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.] ---------- Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each EDG auto-starts from standby condition and: a. In ≤ 17 seconds after auto-start and during tests, achieves voltage ≥ 3,744 V and frequency ≥ 58.8 Hz, b. Achieves steady state voltage ≥ 3,744 V and ≤ 4,576 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz, c. Operates for ≥ 5 minutes d. Permanently connected loads remain energized from the offsite power system, and e. Emergency loads are energized or auto-connected through the automatic load sequencer from the offsite power system.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	---------- NOTE ---------- [This Surveillance shall not be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.]. ---------- Verify each EDG's noncritical automatic trips are bypassed on an actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal.	18 months
SR 3.8.1.14	---------- NOTES ---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. This Surveillance shall not be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. 3. If performed with EDG synchronized with offsite power, it shall be performed at a power factor ≤ [0.9]. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable. ---------- Verify each EDG operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 105 % rating and ≤ 110 % rating and; b. For the remaining hours of the test loaded ≥ 90 % rating and ≤ 100 % rating.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	---------- NOTES ---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the EDG after the EDG has operated in ≥ 2 hours loaded ≥ 90 % rating and ≤ 100 % rating. Momentary transients outside of load range do not invalidate this test. 2. All EDG starts may be preceded by an engine prelube period. ---------- Verify each EDG starts and achieves: a. In ≤ 17 seconds, voltage ≥ 3,744 V and frequency ≥ 58.8 Hz b. Steady state voltage ≥ 3,744 V and ≤ 4,576 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz	18 months
SR 3.8.1.16	---------- NOTE ---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each EDG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power. b. Transfers loads to offsite power source, and c. Returns to ready to load operation	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.17	---------- NOTE ---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR ---------- Verify, with an EDG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by: a. Returning EDG to ready-to-load operation and b. Automatically energizing emergency loads from offsite power.	18 months
SR 3.8.1.18	---------- NOTE ---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify interval between each sequenced load block is within ± 10 % of design interval for each emergency and shutdown load sequencer.	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. [All EDG starts may be preceded by an engine prelube period] 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses, b. Load shedding from emergency buses, c. EDG auto-starts from standby condition and: 1. Energizes permanently connected loads in ≤ 19 seconds, 2. Energizes auto-connected emergency loads through load sequencer, 3. Achieves steady state voltage ≥ 3,744 V and ≤ 4,576 V, 4. Achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. Supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to minimum established float voltage.	7 days
SR 3.8.4.2	Verify battery chargers A and B supply 700 amps and battery chargers C and D supply 1,200 amps at greater than or equal to the minimum established float voltage for ≥ 8 hours. OR Verify each battery charger can recharge the battery to the fully charged state within 24 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.	18 months
	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.6.6 may be performed in lieu of SR 3.8.4.3. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**162-8055**
SRP Section:	**16 - Technical Specifications**
Application Section:	**16**
Date of RAI Issue:	**08/20/2015**

Question No. 16-51

The applicant is requested to address the formatting of Logical Connectors in the Technical Specifications (TS). The requirements for the formatting of Logical Connectors are located in TS Section 1.2. There is also guidance in Section 2.1.5 of the Writer's Guide for Plant Specific Improved Technical Specifications. Some examples of the improper formatting of Logical Connectors include:

Logical Connectors in Required Action column should be indented according to TS Section 1.2. The Logical Connectors should align with the period after first number for second nesting level.

This proper indentation does not occur for Logical Connectors between Required Actions B.2.1 and B.2.2, and B.2.2 and B.2.3 for TS 3.8.5.

Logical Connector usage in Condition column should be on separate line between Condition statements and should be underlined. The Logical Connector "OR" is used inline between two Condition statements, and is not underlined in TS 3.5.2 Condition A.

In the REQUIRED ACTIONS column of ACTIONS A, B, and D of TS 3.1.7, should align flush left for the first nesting level.

The applicant is requested to perform a global check of the Logical Connectors to ensure that the requirements of TS Section 1.2 are met, which will align the TS with the STS.

Response

The global check was performed to ensure that the proper Logical Connectors are being used. The DCD will be revised to meet the requirements of TS Section 1.2.

Impact on DCD

Same as changes described in the Impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

The following Technical Specifications will be revised as indicated in the attachment: 1.2, 1.3 3.1.1, 3.1.2, 3.1.7, 3.2.1, 3.2.2, 3.2.4, 3.3.1, 3.3.2, 3.3.3, 3.3.5, 3.3.6, 3.3.8, 3.3.9, 3.3.14, 3.4.10, 3.4.14, 3.4.17, 3.5.2, 3.5.3, 3.7.5, 3.7.15, 3.8.1, 3.8.2, 3.8.5, 3.8.8, 3.8.10, 3.9.4, and 3.9.5.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Trip … OR A.2.1 Verify … AND A.2.2.1 Reduce … OR A.2.2.2 Perform … OR A.3 Align …	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-7

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Verify affected subsystem isolated. AND A.2 Restore subsystem to OPERABLE status	1 hour AND Once per 8 hours thereafter 72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

Required Action A.1 has two Completion Times. The 1-hour Completion Time begins at the time the Condition is entered and each “Once per 8 hours thereafter” interval begins upon performance of Required Action A.1.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM) - T_{cold} > 99 °C (210 °F)

LCO 3.1.1

a. SDM shall be within the limits specified in the COLR.

b. k_{N-1} shall be < 0.99.

c. With reactor trip circuit breakers (RTCBs) closed: Reactor criticality shall not be achieved with shutdown group CEA movement.

APPLICABILITY: MODES 3 and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limit.	15 minutes
B. k_{N-1} not within limit. OR Reactor criticality can be achieved by shutdown group CEA movement when RTCBs are closed.	B.1 Vary CEA position to restore within limit. AND B.2 Initiate boration to restore within limit.	15 minutes 15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify SDM to be within the limits specified in the COLR.	24 hours
SR 3.1.1.2	Verify k_{N-1} < 0.99.	24 hours
SR 3.1.1.3	Verify criticality cannot be achieved with shutdown group CEA movement when RTCBs are closed.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 SHUTDOWN MARGIN (SDM) - T_{cold} ≤ 99 °C (210 °F)

LCO 3.1.2

a. SDM shall be within the limits specified in the COLR.

b. k_{N-1} shall be < 0.99.

c. With reactor trip circuit breakers (RTCBs) closed: Reactor criticality shall not be achieved with shutdown group CEA movement.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limit.	15 minutes
B. k_{N-1} not within limit. OR Reactor criticality can be achieved by shutdown group CEA movement when RTCBs are closed.	B.1 Vary CEA position to restore within limit. AND B.2 Initiate boration to restore within limit.	15 minutes 15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.2.1	Verify SDM to be within the limits specified in the COLR.	24 hours
SR 3.1.2.2	Verify k_{N-1} < 0.99.	24 hours
SR 3.1.2.3	Verify criticality cannot be achieved with shutdown group CEA movement when RTCBs are closed.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Regulating Control Element Assembly (CEA) Insertion Limits

LCO 3.1.7 The power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and

a. With the core operating limit supervisory system (COLSS) in service, the regulating CEA groups shall be limited to the withdrawal sequence, insertion limits, and associated time restraints specified in the COLR.

b. With COLSS out of service, the regulating CEA groups shall be limited to the withdrawal sequence, insertion limits, and associated time restraints specified in the COLR.

APPLICABILITY: MODES 1 and 2.

NOTE

This LCO is not applicable while conducting SR 3.1.5.3 or during reactor power cutback operation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Regulating CEA groups inserted beyond the transient insertion limit with COLSS in service.	A.1 Restore regulating CEA groups to within limits.	2 hours
	OR	
	A.2 Reduce THERMAL POWER to less than or equal to the fraction of RTP allowed by the CEA group position and insertion limits specified in the COLR.	2 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Regulating CEA groups inserted between the long term steady state insertion limit and the transient insertion limit for > 4 hours per 24 hour interval with COLSS in service.	B.1 Verify short term steady state insertion limits are not exceeded. OR B.2 Restrict increases in THERMAL POWER to ≤ 5 % RTP per hour.	15 minutes 15 minutes
C. Regulating CEA groups inserted between the long term steady state insertion limit and the transient insertion limit for > 5 effective full power days (EFPD) per 30 EFPD interval or > 14 EFPD per 365 EFPD interval with COLSS in service.	C.1 Restore regulating CEA groups to within long term steady state insertion limit.	2 hours
D. Regulating CEA groups inserted beyond the short term steady state insertion limit with COLSS out of service.	D.1 Restore regulating CEA groups to within limits. OR D.2 Reduce THERMAL POWER to less than or equal to the fraction of RTP allowed by the CEA group position and short term steady state insertion limit specified in the COLR.	2 hours 2 hours

3.2 POWER DISTRIBUTION LIMITS

3.2.1 Linear Heat Rate (LHR)

LCO 3.2.1 LHR shall not exceed the limit specified in the COLR.

APPLICABILITY: MODE 1 with THERMAL POWER > 20 % RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Core operating limit supervisory system (COLSS) calculated core power exceeds the COLSS calculated core power operating limit based on LHR.	A.1 Restore LHR to within limit.	1 hour
B. One OPERABLE core protection calculator (CPC) calculated LHR not within region of acceptable operation when the COLSS is out of service.	B.1 Determine trend in LHR. AND B.2.1 With an adverse trend, restore LHR to within limit. OR B.2.2 With no adverse trend, restore LHR to within limit.	Once per 15 minutes 1 hour 4 hours
C. Required Action and associated Completion Time not met.	C.1 Reduce THERMAL POWER to ≤ 20 % RTP.	6 hours

3.2 POWER DISTRIBUTION LIMITS

3.2.2 Planar Radial Peaking Factors (F_{xy})

LCO 3.2.2 The measured planar radial peaking factors (F^M_{xy}) shall be equal to or less than the planar radial peaking factors (F^C_{xy}) used in the core operating limit supervisory system (COLSS) and in the core protection calculators (CPCs).

APPLICABILITY: MODE 1 with THERMAL POWER > 20 % RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. $F^M_{xy} > F^C_{xy}$.	A.1.1 Adjust addressable CPC constants to increase the multiplier applied to planar radial peaking by a factor $\geq F^M_{xy} / F^C_{xy}$.	6 hours
	AND	
	A.1.2 Maintain a margin to the COLSS operating limits of $[(F^M_{xy} / F^C_{xy}) - 1.0] \times 100$ %.	6 hours
	OR	
	A.2 Adjust affected F^C_{xy} used in COLSS and CPCs to a value greater than or equal to the measured F^M_{xy}.	6 hours
	OR	
	A.3 Reduce THERMAL POWER to ≤ 20 % RTP.	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. DNBR outside the region of acceptable operation when COLSS is out of service.	B.1 Determine trend in DNBR. AND B.2.1 With an adverse trend, restore DNBR to within limit. OR B.2.2 With no adverse trend, restore DNBR to within limit.	Once per 15 minutes 1 hour 4 hours
C. Required Action and associated Completion Time not met.	C.1 Reduce THERMAL POWER to ≤ 20 % RTP.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	---------- NOTE ---------- Only applicable when COLSS is out of service. With COLSS in service, this parameter is continuously monitored. ---------- Verify DNBR, as indicated on all OPERABLE DNBR channels, is within limit of Figure 3.2.4-2 or 3.2.4-3 of COLR, as applicable.	2 hours
SR 3.2.4.2	Verify COLSS margin alarm actuates at a THERMAL POWER level equal to or less than core power operating limit based on DNBR.	31 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one operating bypass removal channel inoperable.	C.1 Disable bypass channel. OR C.2.1 Place affected automatic trip channel in bypass or trip. AND C.2.2 Restore operating bypass removal channel and associated automatic trip channel to OPERABLE status.	1 hour 1 hour Prior to next entry into MODE 2 following entry into MODE 5
D. One or more Functions with two operating bypass removal channels inoperable.	---------- NOTE ---------- LCO 3.0.4 is not applicable. ---------- D.1 Disable bypass channels. OR D.2 Place one affected automatic trip channel in bypass and place the other in trip.	 1 hour 1 hour
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One automatic bypass removal channel inoperable.	C.1 Disable bypass channel. OR C.2.1 Place affected automatic trip channel in bypass or trip. AND C.2.2 Restore operating bypass removal channel and associated automatic trip channel to OPERABLE status.	1 hour 1 hour Prior to next entry into MODE 2 following entry into MODE 5
D. Two automatic bypass removal channels inoperable.	D.1 Disable bypass channels. OR D.2 Place one affected automatic trip channel in bypass and place the other in trip.	1 hour 1 hour
E. Required Action and associated Completion Time not met.	E.1 Open all RTSGs.	1 hour

3.3 INSTRUMENTATION

3.3.3 Control Element Assembly Calculators (CEACs)

LCO 3.3.3 Two CEACs shall be OPERABLE in each Core Protection Calculator System (CPCS) channel.

APPLICABILITY: MODES 1 and 2.

ACTIONS

NOTE
Separate Condition entry is allowed for each CPCS channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CEAC inoperable in one or more CPCS channels.	A.1 Declare affected CPCS channel(s) inoperable.	1 hour
	OR	
	A.2.1 Verify indicated position of each full and part strength CEA is within 16.8 cm (6.6 in) of all other CEAs in its group.	Once per 4 hours
	AND	
	A.2.2 Restore CEAC to OPERABLE status.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR Both CEACs inoperable in one or more CPCS channels.	B.1 Declare affected channel(s) inoperable. OR	1 hour
	B.2.1 Verify departure from nucleate boiling ratio requirement of LCO 3.2.4 is met and Reactor Power Cutback System (RPCS) is disabled. AND	4 hours
	B.2.2 Verify all full strength and part strength CEA groups are fully withdrawn and maintained fully withdrawn, except during Surveillance testing pursuant to SR 3.1.5.3, or for power control, when CEA group #5 may be inserted to a maximum of 323.9 cm (127.5 in). AND	4 hours
	B.2.3 Verify addressable constant in each affected CPC is set to indicate that all two CEACs are inoperable and “RSPT/CEAC inoperable” status is indicated. AND	4 hours
	B.2.4 Verify Digital Rod Control System (DRCS) is placed in “standby” and maintained in “standby,” except during CEA motion permitted by Required Action B.2.2. AND	4 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one automatic operating bypass removal channel inoperable.	C.1 Disable bypass channel. OR C.2.1 Place affected automatic trip channel in bypass or trip. AND C.2.2 Restore operating bypass removal channel and associated automatic trip channel to OPERABLE status.	1 hour 1 hour Prior to next entry into MODE 2 following entry into MODE 5
D. One or more Functions with two automatic operating bypass removal channels inoperable.	---------- NOTE ---------- LCO 3.0.4 is not applicable. ---------- D.1 Disable bypass channels. OR D.2 Place one affected automatic trip channel in bypass and place the other in trip.	 1 hour 1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time not met.	E.1 NOTE Only applicable to functions 3, 5, and 6 of Table 3.3.5-1. Be in MODE 3.	6 hours
	AND	
	E.2 Be in MODE 4.	12 hours
F. Required Action and associated Completion Time not met.	E.1 NOTE Only applicable to functions 1, 2, and 4 of Table 3.3.5-1. Be in MODE 3.	6 hours
	AND	
	F.2 Be in MODE 5.	36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one Actuation Logic channel inoperable.	C. ---------- NOTE ---------- One channel of Actuation Logic may be bypassed for up to 1 hour for Surveillances, provided the other channel is OPERABLE. ---------- Restore inoperable channel to OPERABLE status.	48 hours
D. One or more Functions with one Diverse Manual ESF Actuation Channels inoperable	D. Restore channels to OPERABLE Status.	72 hours
E. Required Action and associated Completion Time not met.	E. ---------- NOTE ---------- Applies only to Functions 3, 5 and 6 of Table 3.3.6-1 ---------- Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
F. Required Action and associated Completion Time not met.	F.1 ---------- NOTE ---------- Applies only to Functions 1 and 4 of Table 3.3.6-1. ---------- Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. CPIAS Manual Actuation, Actuation Logic, or one or more required channels of radiation monitors inoperable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment.	C.1 Place and maintain containment purge and exhaust valves in closed position.	Immediately
	OR	
	C.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	C.2.2 Suspend movement of irradiated fuel assemblies in containment.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. CREVAS Manual Actuation, Actuation Logic, or radiation monitors channels inoperable during CORE ALTERATIONS or movement of irradiated fuel assemblies.	C.1 Place one control room area HVAC system train in emergency operation mode.	Immediately
	OR	
	C.2.1 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	C.2.2 Suspend positive reactivity additions.	Immediately
	AND	
	C.2.3 Suspend CORE ALTERATIONS.	Immediately

3.3 INSTRUMENTATION

3.3.14 Boron Dilution Alarms

LCO 3.3.14 Two startup channel high neutron flux alarms shall be OPERABLE.

APPLICABILITY: MODES 3, 4, and 5.

NOTE

MODE 3, within 1 hour after the neutron flux is within the startup range following a reactor shutdown.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One startup channel high neutron flux alarm inoperable.	NOTE Turn on auxiliary charging pump if necessary.	
	A.1 Turn off charging pump and determine the RCS boron concentration.	Immediately AND At the monitoring Frequency specified in the COLR
	AND	
	A.2 Suspend all operations involving positive reactivity additions.	Immediately
B. Two startup channel high neutron flux alarms inoperable.	NOTE Turn on auxiliary charging pump if necessary.	
	B.1 Turn off charging pump and determine the RCS boron concentration by redundant methods.	Immediately AND At the monitoring Frequency specified in the COLR
	AND	

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Pilot Operated Safety Relief Valves (POSRVs)

LCO 3.4.10 Four pressurizer POSRVs shall be OPERABLE such that:

a. Two spring-loaded pilot valves shall be OPERABLE with lift settings ≥ 171.1 kg/cm^{2}A (2,433 psia) and ≤ 176.3 kg/cm^{2}A (2,507 psia).

b. The opening time of pressurizer POSRV shall be OPERABLE within 0.5 seconds, including dead time

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 with all RCS cold leg temperature greater than the LTOP enable temperature specified in the PTLR.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer POSRV inoperable.	A.1 Restore pressurizer POSRV to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time of Condition A not met. OR Two or more pressurizer POSRVs inoperable.	B.1 Be in MODE 3. AND B.2.1 Be in MODE 4 with all RCS cold leg temperatures less than or equal to LTOP enable temperature specified in PTLR. OR B.2.2 Be in MODE 4 on shutdown cooling with requirements of LCO 3.4.11 met.	6 hours 12 hours 12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Leakage Detection Instrumentation

LCO 3.4.14 The following RCS leakage detection instrumentation shall be OPERABLE:

a. One containment sump (level) monitor

b. One containment atmosphere radioactivity (particulate) monitor

c. One containment atmosphere humidity monitor

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channel(s) inoperable.	A.1 ---------- NOTE ---------- Not required until 12 hours after establishment of steady state operation. ----------	
	Perform SR 3.4.12.1.	Once per 24 hours
	AND	
	A.2 Restore required containment sump monitor to OPERABLE status.	31 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required containment atmosphere radioactivity monitor inoperable.	B.1.1 Analyze grab samples of the containment atmosphere.	Once per 24 hours
	OR	
	B.1.2 ---------- NOTE ---------- Not required until 12 hours after establishment of steady state operation. ----------	
	Perform SR 3.4.12.1.	Once per 24 hours
	AND	
	B.2.1 Restore required containment sump monitor to OPERABLE status.	31 days
	OR	
	B.2.2 Restore required containment sump monitor to OPERABLE status.	31 days
C. Containment atmosphere humidity monitor inoperable.	C.1 Perform SR 3.4.14.1.	Once per 8 hours
	OR	
	C. 2 ---------- NOTE ---------- Not required until 12 hours after establishment of steady state operation. ----------	
	Perform SR 3.4.12.1.	Once per 24 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
---------- NOTE ---------- Only applicable when the containment atmosphere gaseous radiation monitor is the only OPERABLE monitor. ---------- D. Required containment sump monitor inoperable. AND Containment atmosphere humidity monitor inoperable.	D.1 Analyze grab samples of containment atmosphere. AND D.2.1 Restore required containment sump monitor to OPERABLE status. OR D.2.2 Restore containment atmosphere humidity monitor to OPERABLE status.	Once per 12 hours 7 days 7 days
E. Required containment atmosphere radioactivity monitor inoperable. AND Containment atmosphere humidity monitor inoperable.	E.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status. OR E.2 Restore containment atmosphere humidity monitor to OPERABLE status.	31 days 31 days
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours
G. All required monitors inoperable.	G.1 Enter LCO 3.0.3.	Immediately

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube repair criteria shall be plugged in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

NOTE

Separate Condition entry is allowed for each SG tube.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SG tubes satisfying the tube repair criteria and not plugged in accordance with the Steam Generator Program.	A.1 Verify tube integrity of affected tube(s) is maintained until next refueling outage or SG tube inspection. AND A.2 Plug affected tube(s) in accordance with Steam Generator Program.	7 days Prior to entering MODE 4 following the next refueling outage or SG tube inspection
B. Required Action and associated Completion Time of Condition A or B not met. OR SG tube integrity not maintained.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

3.5.2 Safety Injection System (SIS) – Operating

LCO 3.5.2 Four trains of SIS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One train inoperable OR Two trains inoperable and diagonally oriented with respect to reactor vessel.	A.1 Restore train to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours
C. Two or more trains inoperable for reasons other than Condition A.	C.1 Enter LCO 3.0.3.	Immediately

3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

3.5.3 Safety Injection System (SIS) – Shutdown

LCO 3.5.3 Two trains of SIS shall be OPERABLE and diagonally oriented with respect to reactor vessel.

APPLICABILITY: MODES 4 and 5,
MODE 6 with RCS level < 39.7 m (130 ft 0 in)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required SIS train inoperable.	A.1 Restore required SIS train to OPERABLE status.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1.1 Verify RCS level ≥ 39.7 m (130 ft 0 in).	Immediately
	OR	
	B.1.2 Initiate actions to restore RCS level to ≥ 39.7 m (130 ft 0 in).	Immediately
	AND	
	B.2 Reduce RCS cold leg temperature to < 57.2 °C (135 °F).	24 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One turbine driven AFW train inoperable due to associated inoperable steam supply. AND One motor driven AFW train inoperable.	C.1 Restore steam supply to turbine driven train to OPERABLE status. OR C.2 Restore motor driven AFW train to OPERABLE status.	48 hours 48 hours
D. Required Action and associated Completion Time of Conditions A, B, or C not met. OR Three AFW trains inoperable in MODE 1, 2, or 3.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	6 hours 18 hours
E. Four AFW trains inoperable in MODE 1, 2, or 3.	---------- NOTE ---------- LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. ---------- E.1 Initiate action to restore one AFW train to OPERABLE status.	 Immediately

3.7 PLANT SYSTEMS

3.7.15 Spent Fuel Pool Boron Concentration

LCO 3.7.15 The spent fuel pool boron concentration shall be ≥ 2,150 ppm.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool and spent fuel pool verification has not been performed since the last movement of fuel assemblies in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool boron concentration not within limit.	---------- NOTE ---------- LCO 3.0.3 is not applicable. ----------	
	A.1 Suspend movement of fuel assemblies in spent fuel pool.	Immediately
	AND	
	A.2.1 Initiate action to restore spent fuel pool boron concentration to within limit.	Immediately
	OR	
	A.2.2 Initiate action to perform a fuel storage pool verification.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.15.1	Verify spent fuel pool boron concentration is within limit.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or two EDGs on one division inoperable.	B.1 Perform SR 3.8.1.1 for the OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND	
	B.2 Declare required feature(s) supported by the inoperable EDG(s) inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND	
	B.3.1 Determine OPERABLE EDG(s) is not inoperable due to common cause failure.	24 hours
	OR	
	B.3.2 Perform SR 3.8.1.2 for OPERABLE EDG(s).	24 hours
	AND	
	B.4 Restore EDG(s) to OPERABLE status.	72 hours
C. Two offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features
	AND	
	C.2 Restore one offsite circuit to OPERABLE status.	24 hours

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources – Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution system required by LCO 3.8.10, “Distribution Systems – Shutdown” and

b. One division of emergency diesel generators (EDGs) capable of supplying one division of the onsite Class 1E AC Electrical Power Distribution System required by LCO 3.8.10.

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	---------- NOTE ---------- Enter applicable Conditions and Required Actions of LCO 3.8.10, with one required division de-energized as a result of Condition A. ----------	
	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Suspend operations involving positive reactivity additions that could result in a loss of required SDM or boron concentration.	Immediately
	AND	
	A.2.3 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. One or two required EDGs on one division inoperable.	B.1 Suspend movement of irradiated fuel assemblies	Immediately
	AND	
	B.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration	Immediately
	AND	
	B.3 Initiate action to restore required EDG(s) to OPERABLE status	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	---------- NOTE ---------- The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.9 through SR 3.8.1.11, SR 3.8.1.13 through SR 3.8.1.16, and SR 3.8.1.18. ---------- For AC sources required to be OPERABLE, the SRs of Specification 3.8.1, “AC Sources – Operating,” except SR 3.8.1.8, SR 3.8.1.12, SR 3.8.1.17, SR 3.8.1.19, and SR 3.8.1.20 are applicable.	In accordance with applicable SRs

ACTION (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more required DC electrical power system division(s) inoperable [for reasons other than Condition A.] OR Required Action and associated Completion Time of Condition A not met.	B.1 Declare affected required feature(s) inoperable. OR B.2.1 Suspend movement of irradiated fuel assemblies. AND B.2.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND B.2.3 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately Immediately Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	---------- NOTE ---------- The following SRs are not required to be performed: SR 3.8.4.2 and SR 3.8.4.3. ---------- For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.2 SR 3.8.4.3	 In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters – Shutdown

LCO 3.8.8 Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution system division(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

NOTE

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more inverters inoperable.	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.2 Suspend operations involving positive reactivity additions that could result in a loss of required SDM or boron concentration.	Immediately
	AND	
	A.2.3 Initiate action to restore inverters to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems – Shutdown

LCO 3.8.10 The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

NOTE

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	
	A.2.3 Initiate actions to restore required AC, DC, and AC vital electrical power distribution subsystem(s) to OPERABLE status.	Immediately
	AND	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.6.1 Close each penetration providing direct access from the containment atmosphere to the outside atmosphere with a manual or automatic isolation valve, blind flange, or equivalent.	4 hours
	OR	
	A.6.2 Verify each penetration is capable of being closed by an OPERABLE containment purge system.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.4.1	Verify one SCS train is in operation and circulating reactor coolant at a flow rate of ≥ 15,710 L/min (4,150 gpm).	12 hours
SR 3.9.4.2	Verify required SCS train piping locations susceptible to gas accumulation are sufficiently filled with water.	31 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Containment spray pump in the same train as an operating SCS train inoperable.	C.1 If the containment spray pump in the alternate SCS train is OPERABLE, initiate action to place that SCS train in operation.	Immediately
	AND	
	C.2 Monitor SCS performance.	Every 30 minutes
	AND	
	C.3 Restore containment spray pump to OPERABLE status.	48 hours
D. Required Action and Completion time of Item C.3 not met.	D.1 Raise RCS level > EL 38.72 m (127'-1/4").	6 hours
E. Required Actions and associated Completion Tmes of Conditions A, B, and C not met.	E.1 Close equipment hatch and secure with [four] bolts.	4 hours
	AND	
	E.2 Close one door in each air lock.	4 hours
	AND	
	E.3.1 Close each penetration providing direct access from the containment atmosphere to the outside atmosphere with a manual or automatic isolation valve, blind flange, or equivalent.	4 hours
	OR	
	E.3.2 Verify each penetration is capable of being closed by an OPERABLE containment purge system.	4 hours

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**162-8055**
SRP Section:	**16 - Technical Specifications**
Application Section:	**16**
Date of RAI Issue:	**08/20/2015**

Question No. 16-52

Justify the deviation from the STS and the Writer's Guide for Plant Specific Improved Technical Specifications regarding the formatting of APPLICABILITY statements.

Section 2.5.4.b.1 of the Writer's Guide states "When a single Applicability statement continues to a second line, the wrapped line is indented five spaces to indicate this. In ISTS Revision 2, the wrapped line is not always indented five spaces. This should be corrected in the development of the plant specific ITS."

Two examples of the wrapped second line of text not being indented five spaces occur in the APPLICABILITY statements of Technical Specification 3.3.4 and 3.3.7.

The applicant is request to perform a global check of the TS to ensure that all APPLICABILITY statements are formatted correctly. This would align the text with the STS and the guidance contained in the Writer's Guide.

Response

A comprehensive check has been performed to ensure that all APPLICABILITY statements are formatted correctly. The DCD will be revised to follow the guidance of the Writer's Guide for indenting of wrapped second lines of the APPLICABILITY statements.

Impact on DCD

Same as changes described in the Impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

Technical Specifications 3.3.4, 3.3.7, 3.3.13, 3.4.3, 3.4.10, 3.4.11, 3.4.13, 3.7.15, 3.8.6, 3.9.4, 3.9.5, and 3.9.6 will be revised as indicated in the attachment.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

3.3 INSTRUMENTATION

3.3.4 Reactor Protection System (RPS) Logic and Trip Initiation

LCO 3.3.4 Four RPS logic channels (Coincidence, Initiation Logic), four channels of Reactor Trip Switchgears (RTSGs), and four manual trip channels shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, with any RTSGs closed and any control element assemblies capable of being withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- NOTE ---------- RTSGs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST ---------- One channel of Manual Trip, RTSG, or RPS logic inoperable in MODE 1 or 2.	A.1 Open affected RTSGs.	1 hour
B. ---------- NOTE ---------- RTSGs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST ---------- One channel of Manual Trip, RTSG, or RPS logic inoperable in MODE 3, 4, or 5.	B.1 Open affected RTSGs.	48 hours

3.3 INSTRUMENTATION

3.3.7 Emergency Diesel Generator (EDG) – Loss of Voltage Start (LOVS)

LCO 3.3.7 Four channels of Loss of Voltage Function and four channels of Degraded Voltage Function auto-initiation instrumentation per EDG shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated EDG is required to be OPERABLE by LCO 3.8.2, "AC Sources – Shutdown."

ACTIONS

NOTE
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel per EDG inoperable.	A.1 Place channel in bypass or trip. AND A.2 Restore channel to OPERABLE status.	1 hour Prior to entering MODE 2 following next MODE 5 entry
B. One or more Functions with two channels per EDG inoperable.	B.1 Enter applicable Conditions and Required Actions for associated EDG made inoperable by EDG – LOVS instrumentation. OR B.2 Place one channel in bypass and the other channel in trip.	1 hour 1 hour

3.3 INSTRUMENTATION

3.3.13 Logarithmic Power Monitoring Channels

LCO 3.3.13 Two logarithmic power level monitoring instrumentation shall be OPERABLE.

APPLICABILITY: MODES 3, 4, and 5 with the reactor trip switchgears (RTSGs) open or control element assembly (CEA) drive system not capable of CEA withdrawal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channel(s) inoperable.	A.1 ---------- NOTE ---------- Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM. ---------- Suspend all operations involving positive reactivity additions.	Immediately
	AND	
	A.2 Perform SDM verification in accordance with SR 3.1.1.1 if T_{cold} > 99 °C (210 °F) or SR 3.1.2.1 if T_{cold} ≤ 99 °C (210 °F).	4 hours AND Once per 12 hours thereafter

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in PTLR.

APPLICABILITY: At all times (except when reactor vessel closure head is fully de-tensioned such that the RCS cannot be pressurized).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------- NOTE ---------- Required Action A.2 shall be completed whenever Condition A is entered. ---------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5 with RCS pressure < 33.7 kg/cm^{2}A (479 psia).	6 hours 36 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Pilot Operated Safety Relief Valves (POSRVs)

LCO 3.4.10 Four pressurizer POSRVs shall be OPERABLE such that:

a. Two spring-loaded pilot valves shall be OPERABLE with lift settings ≥ 171.1 kg/cm^{2}A (2,433 psia) and ≤ 176.3 kg/cm^{2}A (2,507 psia).

b. The opening time of pressurizer POSRV shall be OPERABLE within 0.5 seconds, including dead time

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 with all RCS cold leg temperature greater than the LTOP enable temperature specified in the PTLR.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer POSRV inoperable.	A.1 Restore pressurizer POSRV to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time of Condition A not met. OR Two or more pressurizer POSRVs inoperable.	B.1 Be in MODE 3. AND B.2.1 Be in MODE 4 with all RCS cold leg temperatures less than or equal to LTOP enable temperature specified in PTLR. OR B.2.2 Be in MODE 4 on shutdown cooling with requirements of LCO 3.4.11 met.	6 hours 12 hours 12 hours

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.11 LTOP System shall be OPERABLE as follows:

a. Two OPERABLE shutdown cooling system (SCS) suction line relief valves with lift settings ≤ 37.3 kg/cm^{2}G (530 psig) specified in the PTLR, or

b. RCS depressurized and an RCS vent of ≥ 180.6 cm^2 (28 in^2) established.

APPLICABILITY: MODE 4 when any RCS cold leg temperature is less than or equal to the LTOP enable temperature specified in the PTLR,
MODE 5,
MODE 6 when the reactor vessel closure head is on.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required SCS suction line relief valve inoperable in MODE 4.	A.1 Restore required SCS suction line relief valve to OPERABLE status.	7 days
B. One required SCS suction line relief valve inoperable in MODE 5 or 6.	B.1 Restore required SCS suction line relief valves to OPERABLE status.	24 hours
C. Required Action and associated Completion Time not met.	C.1 Depressurize RCS and establish an RCS vent of ≥ 180.6 cm^2 (28 in^2).	8 hours
D. Two required SCS suction line relief valves inoperable.	D.1 Initiate action to establish an RCS vent of ≥ 180.6 cm^2 (28 in^2).	Immediately

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.13 Leakage from each RCS PIV shall be within limits.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the shutdown cooling (SC) flow paths when in SC operation or during the transition to or from SC operation

ACTIONS

NOTE

1. Separate Condition entry is allowed for each flow path.
2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	NOTE Each valve used to satisfy Required Actions A.1 and A.2 must have been verified to meet the Surveillance and Frequency of SR 3.4.13.1 and be on the reactor coolant pressure boundary.	
	A.1 Isolate high pressure portion of affected system from low pressure portion by use of one closed manual, deactivated automatic, or check valve.	4 hours
	AND	
	A.2 Restore RCS PIV leakage to within limit.	72 hours

3.7 PLANT SYSTEMS

3.7.15 Spent Fuel Pool Boron Concentration

LCO 3.7.15 The spent fuel pool boron concentration shall be ≥ 2,150 ppm.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool and spent fuel pool verification has not been performed since the last movement of fuel assemblies in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool boron concentration not within limit.	---------- NOTE ---------- LCO 3.0.3 is not applicable. ----------	
	A.1 Suspend movement of fuel assemblies in spent fuel pool.	Immediately
	AND	
	A.2.1 Initiate action to restore spent fuel pool boron concentration to within limit.	Immediately
	OR	
	A.2.2 Initiate action to perform a fuel storage pool verification.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.15.1	Verify spent fuel pool boron concentration is within limit.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Division I and Division II batteries shall be within limits.

APPLICABILITY: When associated DC electrical power system divisions are required to be OPERABLE.

ACTIONS

NOTE
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or two batteries on one division with one or more battery cells float voltage < 2.07 V.	A.1 Perform SR 3.8.4.1. AND A.2 Perform SR 3.8.6.1. AND A.3 Restore affected cell voltage ≥ 2.07 V.	2 hours 2 hours 24 hours
B. One or two batteries on one division with float current > 2 amps.	B.1 Perform SR 3.8.4.1. AND B.2 Restore battery float current to ≤ 2 amps.	2 hours 12 hours

3.9 REFUELING OPERATIONS

3.9.4 Shutdown Cooling System (SCS) and Coolant Circulation – High Water Level

LCO 3.9.4 One SCS train shall be OPERABLE and in operation.

NOTE

The required SCS train may be removed from operation for ≤ 1 hour per 8-hour period, provided no operations are permitted that would cause dilution of the reactor coolant system boron concentration.

APPLICABILITY: MODE 6 with the water level ≥ 7.0 m (23 ft) above the top of the reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required SCS train inoperable or not in operation.	A.1 Suspend operations involving a reduction in reactor coolant boron concentration.	Immediately
	AND	
	A.2 Suspend loading irradiated fuel assemblies in the core.	Immediately
	AND	
	A.3 Initiate action to satisfy one SCS train to OPERABLE status and operation.	Immediately
	AND	
	A.4 Close equipment hatch and secure with [four] bolts.	4 hours
	AND	
	A.5 Close one door in each air lock	4 hours
	AND	

3.9 REFUELING OPERATIONS

3.9.5 Shutdown Cooling System (SCS) and Coolant Circulation – Low Water Level

LCO 3.9.5 The heat removal system shall be in the following status:

a. Two SCS trains shall be OPERABLE and one SCS train shall be in operation.

b. With REDUCED RCS INVENTORY, the containment spray pump in the same train as an operating SCS train shall be OPERABLE.

APPLICABILITY: MODE 6 with the water level <7.0 m (23 ft) above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SCS train inoperable.	A.1 Initiate action to restore SCS train to OPERABLE status.	Immediately
	AND	
	A.2 Initiate actions to establish ≥ 7.0 m (23 ft) of water above the top of reactor vessel flange.	Immediately
B. No SCS train OPERABLE or in operation.	B.1 Suspend operations involving a reduction in reactor coolant boron concentration.	Immediately
	AND	
	B.2 Initiate action to restore one SCS train to OPERABLE status and to operation	Immediately
	AND	
	B.3 Initiate action to raise RCS level to > EL 38.72 m (127'-1/4") when in REDUCED RCS INVENTORY.	Immediately

3.9 REFUELING OPERATIONS

3.9.6 Refueling Water Level

LCO 3.9.6 Refueling water level shall be maintained ≥ 7 m (23 ft) above the top of reactor vessel flange.

APPLICABILITY: During CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts,
During movement of irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Refueling water level not within limit.	A.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2 Suspend movement of irradiated fuel assemblies within containment.	Immediately
	AND	
	A.3 Initiate actions to restore refueling water level to within limits.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.6.1	Verify refueling water level is ≥ 7 m (23 ft) above the top of reactor vessel flange.	24 hours