Justification for Deviations between NUREG-1431 Rev. 3.1 and US-APWR Technical Specifications

Non Proprietary

November 2007

Revision History

Revision	Page	Description
0	All	Original issue

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ABSTRACT

The US-APWR Technical Specifications contents are described by reference to U.S. Nuclear Regulatory Commission, NUREG-1431, Rev. 3.1. The explanations of justification for deviations between NUREG-1431 and the US-APWR Technical Specifications are helpful in understanding the contents of the US-APWR Technical Specifications.

This report describes the justification for deviation between NUREG-1431 Rev. 3.1 and the US-APWR Technical Specification according to the reviewing procedures in NUREG-0800.

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List of Acronyms

ADV	atmospheric dump valve
AEES	annulus emergency exhaust system
AFW	auxiliary feed water
BIT	boron injection tank
CCW	component cooling water
CAOC	constant axial offset control
COLA	combined license application
COLR	core operating limits report
COT	channel operational test
CREATCS	control room emergency air temperature control system
CREFS	control room emergency filtration system
CS/RHR	containment spray/residual heat removal
CST	condensate storage tank
CT	completion time
DG	diesel generator
DNB	departure from nucleate boiling
ECCS	emergency core cooling system
EFP	emergency feedwater pit
EFW	emergency feedwater
EFWS	emergency feedwater system
FBACS	fuel building air cleanup system
ESFAS	engineered safety features actuation system
ESWS	emergency service water system
GTG	gas turbine generator
HPI	high pressure injection
HVAC	heating, ventilation, and air conditioning
HZP	hot zero power
LCO	limiting condition for operation
LPI	low pressure injection
LOP	loss of power
LTOP	low temperature overpressure protection
MCR	main control room
MCRATCS	main control room air
MCREFS	main control room emergency filtration system
MCRVS	main control room HVAC system
MFBRV	main feedwater bypass regulation valve
MFIV	main feedwater isolation valve
MFRV	main feedwater regulation valve
MSDV	main steam depressurization valve
MSIV	main steam isolation valve
MSSV	main steam safety valve
MTC	moderator temperature coefficient
PAM	post accident monitoring
PIV	pressure isolation valve

PORV	power operated relief valve
PREACS	pump room exhaust air cleanup system
PSMS	protection and safety monitoring system
PTLR	pressure and temperature limits report
RAOC	relaxed axial offset control
RCCA	rod cluster control assembly
RCS	reactor coolant system
RHR	residual heat removal
RSC	remote shutdown console
RTB	reactor trip breaker
RTD	resistance temperature detector
RTDP	revised thermal design procedure
RWSP	refueling water storage Pit
RWST	refueling water storage tank
SDV	safety depressurization valve
SG	steam generator
SGWFCV	steam generator water filling control valve
SI	safety injection
SR	surveillance requirement
SSPS	solid state protection system
STB	staggered test basis
STS	standard technical specification
SWS	service water system
TADOT	trip actuating device operational test
TS	technical specification
UF-RCP	under frequency reactor coolant pump
UHS	ultimate heat sink
UV-RCP	under voltage reactor coolant pump
VDU	visual display unit
VFTP	ventilation filter testing program

1.0 INTRODUCTION

The US-APWR Technical Specifications content meets the 10CFR50.36 requirements. NUREG 1431, Rev. 3.1, Standard Technical Specifications Westinghouse Plants (STS, Ref.1) was selected as the most appropriate guidance for developing the US-APWR Technical Specifications for consistency with the Technical Specification Improvement Program. The US-APWR Technical Specifications differ from STS only as necessary to reflect technical differences between the Westinghouse Owner's Group Standard Technical Specifications design and the US-APWR design.

The explanations of justification for deviations between STS and the US-APWR Technical Specifications are helpful in understanding the contents of the US-APWR Technical Specifications.

This report describes the justification for deviation between STS and Technical Specification for US-APWR according to the reviewing procedures in NUREG-0800.

2.0 JUSTIFICATION FOR DEVIATIONS

All deviations between STS and The US-APWR Technical Specification are described in table 2.0-1. Grayish color boxes in table 2.0-1 are sections in which there is no deviation. First and second column show deviations underlined. Third column shows explanations of justification for deviations. This table shows that all deviations are valid.

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (1/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
16.0				
1.0	USE AND APPLICATION			
1.1	Definitions	Description of digital system component tests is added. -ACTUATION LOGIC TEST -CHANNEL CALIBRATION -CHNNEL CHECK -CHANNEL OPERATIONAL TEST (COT) -TADOT	Unique features of US-APWR	
1.2	Logical Connectors	Same as STS		
1.3	Completion Times	Same as STS		
1.4	Frequency	Same as STS		
2.0	SAFETY LIMITS			
2.1	SLs	-	-	
	DMBR ≥ 1.17 for the WRB-1/WRB-2 DNB correlations.	DMBR ≥ 1.35 for typical hot channel ≥ 1.33 for thimble hot channel With WRB-2 correlation and RTDP.	Reflecting US-APWR design. (The limit DNBR value for US-APWR is determined by using revised thermal design procedure (RTDP), in which the uncertainties of DNB correlation and other key parameters are statistically combined into the DNBR limit, and are not separable.)	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (2/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Peak centerline temperature <5080	Peak centerline temperature<5072	Reflecting US-APWR design. (The maximum value of fuel melting point for US-APWR design is defined as 5072ºF (2800ºC).)	
2.2	SL Violations	Same as STS	-	
3.0	LIMITING CONDITION FOR OPERATION APPLICABILITY			
	Test Exception LCO [3.1.8 and 3.4.19 allow specified Technical Specification (TS) requirements to be changed to permit performance of special tests and operations.	Test Exception LCOs 3.1.8 and 3.1.9 allow specified Technical Specification (TS) requirements to be changed to permit performance of special tests and operations.	PHYSICS TESTS Exceptions for MODE "1" is added as LCO 3.1.8. It is necessary to suspend some limitations related to control rod position and power distribution (LCOs 3.1.4, 3.1.5, 3.1.6, 3.2.3 and 3.2.4). LCO 3.1.8 provides all the nedessary LCO exceptions to perform MODE 1 PHYSICS TESTS. LCO 3.4.19 is taken out. LCO 3.4.19 of NUREG-1431 is text exceptions related to Reactor Coolant System loop operability (LCO 3.4.4), which is not directly relevant to MODE 1 PHYSICS TESTS.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (3/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
3.0	SURVEILLANCE REQUIREMENT APPLICABILITY SR 3.01, SR 3.03	-	-	
	SR3.01 SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3.	Failure to meet a Surveillance for the required equipment, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance for the required equipment within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits.	LCO of 4 train safety system is 3. SR is required for not all four train.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (4/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR 3.03 If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater.	If it is discovered that a Surveillance was not performed within its specified Frequency for the required equipment, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater.	LCO of 4 train safety system is 3. SR is required for not all four train.	
	SR 3.04 Entry into a MODE or other specified condition in the Applicability of an LCO shall only be made when the LCO's Surveillances have been met within their specified Frequency, except as provided by SR 3.0.3. When an LCO is not met due to Surveillances not having been met, entry into a MODE or other specified condition in the Applicability shall only be made in accordance with LCO 3.0.4.	Entry into a MODE or other specified condition in the Applicability of an LCO shall only be made when the LCO's Surveillances have been met within their specified Frequency for the required equipment, except as provided by SR 3.0.3. When an LCO is not met, due to Surveillances not having been met for the required equipment, entry into a MODE or other specified condition in the Applicability shall only be made in accordance with LCO 3.0.4.	LCO of 4 train safety system is 3. SR is required for not all four train.	
3.1	REACTIVITY			

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (5/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	CONTROL SYSTEMS			
3.1.1	SHUTDOWN MARGIN (SDM)	Same as STS	-	
3.1.2	3.1.2 Core Reactivity	Same as STS	-	
3.1.3	3.1.3 Moderator Temperature Coefficient (MTC)	(LCO3.1.3) The maximum upper limit, which is power dependent, is not shown in the LCO.	Safety analyses use bounded method.	Chapter 4.3, Chapter 15.0
3.1.4	3.1.4 Rod Group Alignment Limits	Same as STS	-	
3.1.5	3.1.5 Shutdown Bank Insertion Limits	Same as STS	--	
3.1.6	3.1.6 Control Bank Insertion Limits	Same as STS	-	
3.1.7	3.1.7 Rod Position Indication	Same as STS	-	
3.1.8	-	3.1.8 PHYSICS TESTS Exceptions - MODE 1 (Same as NUREG-1431 Rev.1)	Availability for MODE-1 PHYSICS TEST.	
3.1.9	3.1.8 PHYSICS TESTS Exceptions - MODE 2	3.1.9 PHYSICS TESTS Exceptions - MODE 2	-	
	LCO a RCS lowest loop average temperature is ≥ [531]°F,	RCS lowest loop average temperature is ≥ 541°F.	RCS HZP Temperature is 10°F higher than NUREG-1431. Reflection of US-APWR Design.	
3.2	3.2 POWER DISTRIBUTION LIMITS			
3.2.1 A	3.2.1A Heat Flux Hot Channel Factor (FQ(Z)) (FXY Methodology)	N/A	-	
3.2.1 B	3.2.1B Heat Flux Hot Channel Factor (FQ(Z)) (RAOC-W(Z)	N/A	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (6/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Methodology)			
3.2.1 C	3.2.1C Heat Flux Hot Channel Factor (FQ(Z)) (CAOC-W(Z) Methodology)	-	-	
	"K(Z)" is defined in SR3.2.1.2	"K(Z)" is not defined in SR3.2.1.2	US-APWR does not use K(Z) curve for safety analysis	Chapter 4.3, Chapter 15.6
3.2.2	Nuclear Enthalpy Rise Hot Channel Factor (N FΔH)	Same as STS	-	
3.2.3 A	3.2.3A AXIAL FLUX DIFFERENCE (Constant Axial Offset Control Methodology)	Same as STS	-	
3.2.3 B	3.2.3B AXIAL FLUX DIFFERENCE (Relaxed Axial Offset Control Methodology)	N/A	-	
3.2.4	3.2.4 QUADRANT POWER TILT RATIO	Same as STS	-	
3.3	3.3 INSTRUMENTATION			
3.3.1	All Functions	STS Functions reflected the US-APWR Functions	Reflected the US-APWR Functions	
	3.3.1 Reactor Trip System (RTS) Instrumentation	-	-	
	Condition B	Condition B Completion time longer (72 hrs vs 48)	4 trains. Diverse means for actuating manual trip – remaining two OPERABLE trains and software manual trip functions from VDU screens.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (7/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Condition C	Condition C Applicable to Manual Reactor Trip only in MODES 3, 4, & 5. Other Functions applicable in STS per new Condition D. Completion time longer (72 hrs vs 48)	4 trains. Diverse means for actuating manual trip – remaining two OPERABLE trains and software manual trip functions from VDU screens.	
	Condition C	Condition D Condition specific to RTBs, RTB trip mechanism, and automatic logic in MODES 3, 4, & 5. And change to "required" channel.	Formatting Completion time based on the STS.	
	Conditions E	Change to "required" channel.	Completion time based on the STS.	
	Conditions L,M	Condition L (STS Condition M deleted)	STS Condition M applies to Reactor Coolant Pump Breaker trip channels which does not apply to USAPWR.	
	Conditions N	NA (STS Condition N deleted)	Turbine trip channel Actions moved to Condition L due to 4 train redundancy of turbine trip channels	
	Conditions O	Condition M Change to "required" channel.	Completion time based on the STS.	
	Conditions P	Condition N Change to "required" channel.	Turbine trip channel Actions moved to Condition L due to 4 train redundancy of turbine trip channels	
	Condition's General	Renumbered	Formatting	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (8/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR 3.3.1.2	Added "Adjust nuclear instrument channel if absolute difference is > 1%" in NOTES	Ensuring not exceed safety limit.	
	SR 3.3.1.4	NOTE deleted.	No the reactor trip bypass breaker in the US-APWR.	
	SR 3.3.1.5	Actuation Logic Test Frequency increased from 92 days STB to 24 months.	Digital platform characteristics.	
	SR 3.3.1.7	COT Frequency increased from 182 days to 24 months.	Digital platform characteristics.	
	SR 3.3.1.8	Changed COT to CHANNEL CHECK.	COT is performed same as other parameters in US-APWR. SR3.31.8 is revised to cover SR3.3.1.1 against requirement of SR3.3.1.8 in STS.	
	SR 3.3.1.9	TADOT deleted	No UV-RCP and UF-RCP function in the US-APWR.	
	SR 3.3.1.12	NOTE deleted.	No bypass loop RTD in the US-APWR.	
	SR 3.3.1.13	Deleted.	Reflect fuel cycle for US-APWR and integrate other COT.	
	SR 3.3.1.14	Deleted.	Reflect fuel cycle for US-APWR and integrate other TADOT.	
	SRs General	STS SRs for Master and Slave Relay Testing Deleted	Digital Platform replaced relay scheme used in STS SSPS	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (9/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR's General	Frequency for conducting TADOT, CHANNEL CALIBRATION, and RTS RESPONSE TIME TESTS increased to 24 months from 18 months.	Reflect longer fuel cycle for US-APWR	
	SR's General	Renumbered	Formatting	
3.3.2	3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation	-	-	
	Condition B	Completion time longer	Diverse means for actuating manual ESFAS actuation – remaining two OPERABLE trains and software manual trip functions from VDU screens.	
	Condition D	Added "For Containment Pressure and Main Steam Line Pressure" in NOTES	These functions have actually 4 channel.	
	Condition E	Failed Containment Pressure channel is not placed in Bypass. Shutdown required if channel cannot be restored within completion time.	3 channels required versus STS 4. Operation with only 2 containment channels OPERABLE for an indefinite period of time is not acceptable.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (10/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Condition F	Completion time longer	Diverse means for actuating manual ESFAS actuation – remaining two OPERABLE trains and software manual trip functions from VDU screens. And completion time based on the STS.	
	Condition H,I	Deleted.	Condition G and D	
	NA	New Condition unique to EFW actuation logic train inoperability. Longer completion time than STS	4 train system. Capability of system to satisfy functional requirements and reliability of PSMS due to continuous self-testing and diagnostics.	
	NA	New Condition for Containment Purge Isolation Instrumentation.	Reflect inclusion of STS LCO 3.3.6 into LCO 3.3.2. Increased Completion Time due to 4 train system. Capability of system to satisfy functional requirements and reliability of PSMS due to continuous self-testing and diagnostics.	
	NA	New Condition for Containment Purge Isolation Instrumentation.	Reflect inclusion of STS LCO 3.3.6 into LCO 3.3.2.	
	NA	New Condition for MCR HVAC Instrumentation.	Reflect inclusion of STS LCO 3.3.6 into LCO 3.3.2.	
	Condition's General	Change to "required" channel.	Completion time based on the STS.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (11/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Condition's General	Renumbered	Formatting	
	SR 3.3.2.3	Deleted.	This is used by conventional system. (Actuation Relays)	
	SR 3.3.2.4	Deleted.	This is used by conventional system. (SSPS)	
	SRs General	STS SRs for Master and Slave Relay Testing Deleted	Digital Platform replaced relay scheme used in STS SSPS	
	SRs General	Frequency for conducting COT and TADOT increased to 24 months.	Reliability of digital platform	
	SRs General	Frequency for conducting CHANNEL CALIBRATION, and ESF RESPONSE TIME TESTS increased to 24 months.	Reflect longer fuel cycle for US-APWR	
3.3	3.3.3 Post Accident Monitoring (PAM) Instrumentation	-	-	
	SR 3.3.3.2	Frequency changed from 18 months to 24 months	Reflect longer fuel cycle for US-APWR	
	Table 3.3.3-1 Functions	Table Functions differ in some cases from that listed in STS	Not all Functions listed in STS table are applicable for US-APWR or are used in different scheme.	
3.3.4	3.3.4 Remote Shutdown System	-	-	
	LCO	LCO statement changed to requiring specific Functions to be OPERABLE to requiring the console to be OPERABLE.	The RSC has the same capability for control of equipment as the MCR and therefore, not restricted to a select set of Functions.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (12/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SRs General	SRs for the RSC are not based on verifying OPERABILITY of specific Functions as done in STS. For US-APWR the SRs verifies the capability of the transfer switches to transfer control from the MCR to the RSC and communicate properly with the PSMS.	RSC uses Safety VDUs to communicate with digital platform PSMS rather than a set of hard wired functions routed to the remote shutdown panel.	
	STS Table 3.3.4-1	Not used in US-APWR LCO 3.3.4	The RSC has the same capability for control of equipment as the MCR and therefore, not restricted to a select set of Functions.	
3.3.5	3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation	3.3.5 Loss of Power (LOP) Class 1E Gas Turbine Generator (GTG) Start Instrumentation Refers to Class 1E gas turbine generators and reflects 4 train design.	Unique features of US-APWR	
	-	Add SRs 3.3.5.4 and 3.3.5.5	Reflect interface with digital platform	
3.3.6	3.3.6 Containment Purge and Exhaust Isolation Instrumentation	Remove this column.	This section is included to 3.3.2	
	-	3.3.6 Diverse Actuation System (DAS)	The DAS is considered to meet 10 CFR 50.36(c) (2)(ii) criteria	
3.3.7	3.3.7 Control Room Emergency Filtration System (CREFS)	Delete this column.	This section is included to 3.3.2	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (13/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Actuation Instrumentation			
3.3.8	3.3.8 Fuel Building Air Cleanup System (FBACS) Actuation Instrumentation	Delete this column.	US-APWR has no relevant system. The effect of purification by Iodine filter is not expected..	
3.3.9	3.3.9 Boron Dilution Protection System (BDPS)	Delete this column.	For US-APWR, boron dilution is detected by Source Range NIS.	
3.4	**REACTOR COOLANT SYSTEM**			
3.4.1	RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling Limits	-	-	
	LCO 3.4.1 c RCS total flow rate ≥[284000]gpm	LCO 3.4.1 c RCS total flow rate ≥460,000gpm	Due to high reactor thermal power	
	SR 3.4.1.4 Frequency 18 months	SR 3.4.1.4 Frequency 24 months	24 month refueling cycle.	
3.4.2	RCS Minimum Temperature for Criticality	-	-	
	Each RCS loop average temperature is ≥ [541]°F	Each RCS loop average temperature is ≥ 551°F	RCS HZP Temperature is 10°F higher than NUREG-1431.	Chapter 16 BASES B3.4.2
3.4.3	RCS Pressure and Temperature Limits	Same as STS	-	
3.4.4	RCS Loops - MODES 1 and 2	Same as STS	-	
3.4.5	RCS Loops - MODE 3	-	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (14/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Verify steam generator secondary side water levels are ≥ 17% for required RCS loops.	Verify steam generator secondary side water levels are ≥ 13% for required RCS loops.	13% is set point of low steam generator water level.	
3.4.6	RCS Loops - MODE 4	-	-	
	RHR pumps SG secondary side water levels are ≥ 17% for required RCS loops	CS/RHR pumps SG secondary side water levels are ≥ 13% for required RCS loops	13% is set point of low steam generator water level.	
3.4.7	RCS Loops - MODE 5, Loops Filled	-	-	
	LCO 3.4.7 One residual heat removal (RHR) loop	Two residual heat removal (CS/RHR) loop	Sufficient redundancy of trains CS/RHR pump capacity is 50% x 4.	
	Condition A "One required RHR loop inoperable. AND One RHR loop OPERABLE."	One required RHR loop inoperable. OR One or more required SG's with secondary side water level not within limit AND Two RHR loops OPERABLE and in Operation.	SG with secondary side water level within limit is applicable to remove heat from RCS. Two RHR loops in operation are necessary.	
		Deviation associated with above in Condition B and SR	ditto	
	SG secondary side water levels are ≥ 17% for required RCS loops	SG secondary side water levels are ≥ 13% for required RCS loops	13% is set point of low steam generator water level.	
3.4.8	RCS Loops - MODE 5, Loops Not Filled	-	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (15/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
		Deviations associated with 3.4.7 are involved.	Sufficient redundancy of trains	
3.4.9	Pressurizer			
	LCO b."Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 125 kW"	LCO b."Three groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 120 kW"	Three groups of pressurizer heaters have sufficient capacity.	
3.4.10	Pressurizer Safety Valves	-	-	
	LCO Three pressurizer safety valves shall be OPERABLE with lift settings ≥ 2460 psig and ≤ 2510 psig.	Four pressurizer safety valves shall be OPERABLE with lift settings ≥ 2435 psig and ≤ 2485 psig.	Four Pressurizer Safety Valves have sufficient capacity.	
	Note This exception is allowed for 54 hours following entry into MODE 3 provided a preliminary cold setting	This exception is allowed for 72 hours following entry into MODE 3 provided a preliminary cold setting	Outage time for each safety valve is 18 hours. 4 valves need 72 hours. 72 hr outage time does not have large impact from the point of view of risk.	
3.4.11	Pressurizer Power Operated Relief Valves	3.4.11 Safety Depressurization Valves (SDVs)	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (16/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	PORV	SDV	SDVs have function to decrease RCS pressure during accident and are operated with only manual. On the other hand, PORVs are controlled automatically and operated with manual. The LCO of PORV is modified according to this difference to apply SDV.	
3.4.12	Low Temperature Overpressure Protection System	-	-	
	LCO An LTOP System shall be OPERABLE with a maximum of [one] [high pressure injection (HPI)] pump [and one charging pump] capable of injecting into the RCS and the accumulators isolated and one of the following pressure relief capabilities:	An LTOP System shall be OPERABLE with a maximum of two Safety Injection (SI) pumps and one charging pump capable of injecting into the RCS and the accumulators isolated and one of the following pressure relief capabilities	Modified configuration of LTOP system. PORVs is not credited in US-APWR.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (17/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	a. Two power operated relief valves (PORVs) with lift settings within the limits specified in the PTLR, [b. Two residual heat removal (RHR) suction relief valves with set points ≥ [436.5] psig and ≤ [463.5] psig,] [c. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a set point ≥ [436.5] psig and ≤ [463.5] psig,] or d. The RCS depressurized and an RCS vent of ≥ [2.07] square inches.	a. Two residual heat removal (RHR) suction relief valves with setpoints ≥ 456 psig and £484 psig, or b. The RCS depressurized and an RCS vent of ≥ 2.6 square inches.	ditto	
	Condition A Two or more [HPI] pumps capable of injecting into the RCS.	Three or more SI Pumps capable of injecting into the RCS.	ditto	
	Required Action A1 Initiate action to verify a maximum of [one] [HPI] pump is capable of injecting into the RCS.	Initiate action to verify a maximum of two SI pumps is capable of injecting into the RCS.	ditto	
	Condition E One required RCS relief valve inoperable in MODE 4.	One required RHR suction relief valve inoperable in MODE 4, 5, 6	ditto	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (18/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	Required Action E1 Restore required RCS relief valve to OPERABLE status.	Restore required RHR suction relief valve to OPERABLE status. OR E.2 Depressurize RCS and establish RCS vent of ≥ 2.6 square inches	ditto	
	Condition F, G	N/A	ditto	
	SR 3.4.12.1 Verify a maximum of [one] [HPI] pump is capable of injecting into the RCS.	Verify a maximum of two SI pumps is capable of injecting into the RCS.	ditto	
	SR 3.4.12.5 Verify required RCS vent ≥ [2.07] square inches open.	NOTE: Only required to be performed when complying with LCO 3.4.12.b --- Verify required RCS vent ≥ 2.6 square inches open.	Modified configuration of LTOP system. PORVs is not credited in US-APWR.	
	SR 3.4.12.6 Verify PORV block valve is open for each required PORV.	Verify RHR suction relief valves lift setting.	ditto	
	SR 3.4.12.6 Frequency 72 hours	In accordance with the In-service Testing Program	ditto	
	SR 3.4.12.8, SR 3.4.12.9	N/A	ditto	
3.4.13	RCS Operational LEAKAGE	Same as STS	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (19/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
3.4.14	RCS Pressure Isolation Valve (PIV) Leakage	-	-	
	REQUIRED ACTION A2. "Restore RCS PIV to within limits"	The description in the left column is deleted.	Reflection of US-APWR design.	
	Condition C " RHR System auto closure suction valve interlock function inoperable."	The description in the left column is deleted.	US-APWR doesn't have auto closure function of RHR suction valves.	
	SR 3.4.14.1, SR 3.4.14.2 Test Frequency 18 months	Test Frequency 24 months	24 month refueling cycle.	
	SR 3.4.14.2 NOTE---------- Not required to be met when the RHR System auto closure interlock is disabled in accordance with SR 3.4.12.7. ------ Verify RHR System auto closure interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ [425] psig.	NOTE---------- Not required to be met when the RHR System suction valve interlock is disabled in accordance with SR 3.4.12.7. ------ Verify RHR System suction valve interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ 425 psig.	US-APWR doesn't have auto closure function of suction valves.	
	SR 3.4.14.3 Verify RHR System auto closure interlock causes the valves to close automatically with a simulated or actual RCS pressure signal ≥ [600] psig.	N/A	ditto	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (20/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
3.4.15	RCS Leakage Detection Instrumentation	-	-	
	SR 3.4.15.3, 4, 5 Frequency 18 months	24 months	24 month refueling cycle.	
3.4.16	RCS Specific Activity			
	Condition and SR	・Revise the definition of DOSE EQUIVALENT I-131. ・Add a new TS definition for DOSE EQUIVALENT XE-133. ・Other modification in TSTF-490 R0.	Refection to TSTF-490R0 approved by NRC	
3.4.17	RCS Loop Isolation Valves	N/A	US-APWR has no relevant system.	
3.4.18	RCS Isolated Loop Startup	N/A	US-APWR has no relevant system.	
3.4.19	RCS Loops - Test Exceptions	N/A	Natural Circulation Test is required at low power. This test is necessary for first plant of US-APWR. However, Generic DCD doesn't include this requirement.	Chapter 14.2.12.2.3.9
3.5	EMERGENCY CORE COOLING SYSTEMS (ECCS)			
3.5.1	3.5.1 Accumulators	-	-	
	SR3.5.1.2 Verify borated water volume in each accumulator is ≥ 7853 gallons and ≤ 8171 gallons	Verify borated water volume in each accumulator is ≥ 19,300 gallons and ≤ 19,700 gallons	Safety Analyses confirm validity of these numerical value.	Chapter 15

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (21/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR3.5.1.3 Verify nitrogen cover pressure in each accumulator is ≥ 385psig and ≤ 481 psig	Verify nitrogen cover pressure in each accumulator is ≥ 586psig and ≤ 695 psig	Safety Analyses confirm validity of these numerical value.	Chapter 15
	SR3.5.1.4 Verify boron concentration in each accumulator is ≥ 1900 ppm and ≤ 2100 ppm.	Verify boron concentration in each accumulator is ≥ 4000 ppm and ≤ 4200 ppm.	Safety Analyses confirm validity of these numerical value.	Chapter 15
	SR3.5.1.5 Verify power is removed from each accumulator isolation valve operator when RCS pressure is ≥ 2000 psig	Verify power is removed from each accumulator isolation valve operator when RCS pressure is ≥ 1920 psig	1920psig is set point of permissive (P-11).	
3.5.2	ECCS - Operating	Safety Injection System(SIS)-Operating	US-APWR doesn't have Low Pressure Injection System.	
	LCO, CONDITION A Two ECCS trains shall be OPERABLE.	Three of four SIS trains shall be OPERABLE.	Reflection of highly redundancy of trains	
	-	Application of Risk Informed CT	Application of NEI 06-09	Chapter 16.1, Chapter 16 5.5.18
	Condition C "Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available."	Deletion of the condition in the left column.	Simplified and conservative specification	
	SR3.5.2.4, SR3.5.2.5 18months	SR 24 months	24 month refueling cycle.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (22/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR3.5.2.3 Verify ECCS piping is full of water	Deletion of the SR in the left column.	System configuration of SIS prevent to generate gas accumulation. Full Flow Test can remove gas accumulation in flow path.	Chapter 6.3
	SR3.5.2.5 Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	Deletion of the SR in the left column.	Motor operated valves in the flow path (Accumulator discharge valves) are locked open.	
	SR3.5.2.7 [Verify, for each ECCS throttle valve listed below, each position stop is in the correct position.	Deletion of the SR in the left column.	There is no ECCS throttle valve actuated on SI signal.	Chapter 6
3.5.3	ECCS - Shutdown	-	-	
	NOTE that explain realignment of RHR.	Deletion of the note in the left column.	US-APWR doesn't have Low Pressure Injection (LPI) function.	
	Condition and requirement for LPI function.	Deletion of the description in the left column.	US-APWR doesn't have Low Pressure Injection (LPI) function.	
3.5.4	Refueling Water Storage Tank (RWST)	3.5.4 Refueling Water Storage Pit (RWSP)	US-APWR has RWSP in Containment Vessel instead of RWST.	
	SR3.5.4.1 Verify RWST borated water temperature is ≥ 35°F and ≤ 100°F.	Verify RWSP borated water temperature is ≥ 32°F and ≤ 120°F.	120 degF is Containment maximum temperature during normal operation. 32 degF is the freezing point. These temperatures are used in safety analyses.	Chapter 6

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (23/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR3.5.4.2 RWST borated water minimum vol. 466,200 gallons	SR3.5.4.2 RWSP borated water minimum vol. 44,000ft^3	Safety Analyses confirm validity of these numerical value.	Chapter 15
	SR3.5.4.3 RWST boron concentration ≥2000 ppm and ≤ 2200 ppm	SR3.5.4.3 RWSP boron concentration ≥ 4000 ppm and ≤ 4200 ppm	Safety Analyses confirm validity of these numerical value.	Chapter 15
3.5.5	Seal Injection Flow	N/A	US-APWR has no relevant system.	
	N/A	pH Adjustment	Reflection of US-APWR design.	Chapter 6
3.5.6	Boron Injection Tank (BIT)	N/A	US-APWR has no relevant system.	
3.6	CONTAINMENT SYSTEMS			
3.6.1	Containment (Atmospheric, Subatmospheric, Ice Condenser, and Dual)	Same as STS	-	
3.6.2	Containment Air Locks (Atmospheric, Subatmospheric, Ice Condenser, and Dual)	Same as STS	-	
3.6.3	Containment Isolation Valves (Atmospheric, Subatmospheric, Ice Condenser, and Dual)	-	-	
	Note 1. SR3.6.3.1 Penetration flow path(s) 42 inch	Penetration flow path(s) 36 inch	Reflection of US-APWR design.	
	Conditions D for Shielding Building	Deletion of the description in the left column.	Reflection of US-APWR design.	
	Conditions E for flow path with purge valves	Deletion of the description in the left column.	Reflection of US-APWR design.	
	SR3.6.3.1, SR3.6.3.2 [42] inch purge valve, [8] inch purge valve	Add "high volume" and "low volume" in front of purge valve.	Reflection of US-APWR design.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (24/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	SR3.6.3.6, SR3.6.3.9 Cycle each weight or spring loaded check valve testable during operation	Deletion of the description in the left column.	US-APWR has no weight or spring loaded check valve	
3.6.4 A	Containment Pressure (Atmospheric, Dual, and Ice Condenser)	-	-	
	LCO 3.6.4 Containment pressure shall be ≥ [-0.3] psig and ≤ [+1.5] psig	Containment pressure shall be ≥ -0.3 psig and ≤ +2.0 psig	Safety Analyses confirm validity of these numerical value.	
3.6.4 B	Containment Pressure (Subatmospheric)	N/A	-	
3.6.5 A	Containment Air Temperature (Atmospheric and Dual)	Same as STS	-	
3.6.5 B	Containment Air Temperature (Ice Condenser)	N/A	-	
3.6.5 C	Containment Air Temperature (Subatmospheric)	N/A	-	
3.6.6 A	Containment Spray and Cooling Systems (Atmospheric and Dual) (Credit taken for iodine removal by the Containment Spray System)	-	-	
	LCO, CONDITION A Two containment spray trains and [two] containment cooling trains shall be OPERABLE.	Three of four containment spray trains shall be OPERABLE	Reflection of highly redundancy of trains	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (25/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	-	Note CS train may be considered OPERABLE during alignment and operation for decay heat removal as RHRS if capable of being manually realigned to the CS mode of operation.	Reflection of US-APWR design. CS/RHR pumps have both function of RHR and CS.	
	-	Application of Risk Informed CT	Application of NEI 06-09	Chapter 16.1, Chapter 16 5.5.18
	SR3.6.6B2, SR3.6.6B.7 Description about [required] containment cooling train fan unit.	Deletion of the description in the left column.	US-APWR doesn't have containment cooling train unit.	
	SR3.6.6B.5, SR3.6.6B.6 18months	SR 24months	24 month refueling cycle.	
	SR3.6.6B.3 Verify each [required] containment cooling train cooling water flow rate is ≥ [700] gpm.	Deletion of the description in the left column.	US-APWR doesn't have containment cooling system.	
3.6.6 B	Containment Spray and Cooling Systems (Atmospheric and Dual) (Credit not taken for iodine removal by the Containment Spray System)	N/A	-	
3.6.6 C	3.6.6C Containment Spray System (Ice Condenser)	N/A	-	
3.6.6 D	3.6.6D Quench Spray (QS) System (Subatmospheric)	N/A	-	
3.6.6 E	3.6.6E Recirculation Spray (RS) System	N/A	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (26/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	(Subatmospheric)			
3.6.7	3.6.7 Spray Additive System (Atmospheric, Subatmospheric, Ice Condenser, and Dual)	N/A	US-APWR has no relevant system.	
3.6.8	3.6.8 Shield Building (Dual and Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.9	3.6.9 Hydrogen Mixing System (HMS) (Atmospheric, Ice Condenser, and Dual)	N/A	US-APWR has no relevant system.	
3.6.10	3.6.10 Hydrogen Ignition System (HIS) (Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.11	3.6.11 Iodine Cleanup System (ICS) (Atmospheric and Subatmospheric)	N/A	US-APWR has no relevant system.	
3.6.12	3.6.12 Vacuum Relief Valves (Atmospheric and Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.13	3.6.13 Shield Building Air Cleanup System (SBACS) (Dual and Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.14	3.6.14 Air Return System (ARS) (Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.15	3.6.15 Ice Bed (Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.16	3.6.16 Ice Condenser Doors (Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.17	3.6.17 Divider Barrier Integrity (Ice Condenser)	N/A	US-APWR has no relevant system.	
3.6.18	3.6.18 Containment Recirculation Drains	N/A	US-APWR has no relevant system.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (27/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	(Ice Condenser)			
3.7	3.7 PLANT SYSTEMS			
3.7.1	3.7.1 Main Steam Safety Valves (MSSVs)	-	-	
	LCO 3.7.1 [Five] MSSVs per steam generator shall be OPERABLE.	Six MSSVs per steam generator shall be OPERABLE.	Reflection of US-APWR design.	
	Condition A "One or more steam generators with one MSSV inoperable"	Deletion of the condition in the left column.	STS defines specifics condition in case of one MSSV inoperable. US-APWR apply same procedure regardless the number of inoperable MSSV.	
	Table 3.7.1-1 Maximum allowable power depending on number of operable MSSVs per steam generator.	[Number of operable MSSVs per SG, Maximum allowable power] [5, 77], [4, 59], [3, 42], [2, 25]	Maximum allowable power for US-APWR is decided with corresponding equations in STS	
3.7.2	3.7.2 Main Steam Isolation Valves (MSIVs)	-	-	
	APPLICABILITY: MODE 1,MODES 2 and 3 except when all MSIVs are closed [and de-activated].	APPLICABILITY: MODE 1,MODES 2 and 3 except when all MSIVs are closed	MSIV used in US-APWR doesn't close by de-activation.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (28/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
3.7.3	Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Regulation Valves (MFRVs) [and Associated Bypass Valves]	Main Feedwater Isolation Valves (MFIVs), Main Feedwater Regulation Valves (MFRVs), Main Feedwater Bypass Regulation Valves (MFBRVs), and Steam Generator Waterfilling Control Valves (SGWFCVs)	Section title is changed based on system design.	
	APPLICABILITY: MODES 1, [and 2] [2, and 3] except when MFIV, MFRV, [or associated bypass valve] is closed and [de-activated] [or isolated by a closed manual valve].	APPLICABILITY: MODES 1, [and 2] [2, and 3] except when MFIV, MFRV, Main Feedwater Bypass Regulation Valves (MFBRVs), and Steam Generator Waterfilling Control Valves (SGWFCVs)] is closed.	Reflection of US-APWR design.	
3.7.4	Atmospheric Dump Valves (ADVs)	Main Steam Depressurization Valves (MSDVs)	-	
	[Three] ADV lines shall be OPERABLE.	Four MSDV lines shall be OPERABLE.	Reflection of US-APWR design. MSDVs are motor operated valves with manual control. These valves are safety components. Minimum number expected against accidents is two.	
	SR 3.7.4.2 Frequency 18 months	SR Frequency 24 months	24 month refueling cycle.	
3.7.5	Auxiliary Feedwater (AFW) System	Emergency Feedwater (EFW) System	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (29/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	LCO [Three] AFW trains shall be OPERABLE.	Four EFW trains shall be OPERABLE	Each Injection line from EFW pump to Steam Generator is separated. Two train is inoperable due to accident and single failure criterion. Safety analyses expect two trains. Therefore LCO is four.	
	--NOTE-- [Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.]	--NOTE-- Only required EFW trains, which include motor driven pumps, are required to be OPERABLE in MODE 4. During on-line maintenance, three EFW trains shall be OPERABLE with all EFW pump discharge tie line isolation line isolation valves in all trains open.	In case of each injection line separated, two EWF tains is necessary to feed two Steam Generator. In case of OLM, Each EFW pump can supply water to all Steam Generators through the discharge tie line. LCO is three.	
	-	A.1 and B1 Open EFW pump discharge tie line isolation valves and LCO 3.7.5 is to be applied	To supply water from two EFW pumps to intact Steam Generators, it is necessary to open EFW pump discharge connection line isolation valves. The condition with one inoperable pump is same as the condition with OnLine Maintenance.	
3.7.6	3.7.6 Condensate Storage Tank (CST)	3.7.6 Emergency Feedwater Pit (EFP)	Modified configuration of EFWS	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (30/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	LCO The CST shall be OPERABLE.	Two EFPs shall be OPERABLE.	US-APWR has two 50% EFP.	
	Condition A. CST inoperable.	One or both EFPs inoperable.	US-APWR has two 50% EFP.	
	SR 3.7.6.1 Verify the CST level is ≥ [110,000 gal].	Verify each EFP level is ≥ 241,000 gal	Reflection of US-APWR design.	
3.7.7	3.7.7 Component Cooling Water (CCW) System	-	-	
	LCO Two CCW trains shall be OPERABLE.	Three of four CCW trains shall be OPERABLE	Reflection of highly redundancy of trains	
	Condition A One CCW train inoperable.	Only two CCW trains OPERABLE	Reflection of highly redundancy of trains	
	-	Required Action A2 Apply the requirement of Specification 5.5.18	Application of NEI 06-09	
	SR 3.7.7.2, 3.7.7.3 Frequency 18 months	24 months	24 month refueling cycle.	
3.7.8	3.7.8 Service Water System (SWS)	3.7.8 Essential Service Water System (ESWS)	-	
	LCO Two SWS trains shall be OPERABLE.	Three of four ESWS trains shall be OPERABLE	Reflection of highly redundancy of trains	
	Condition A One SWS train inoperable.	Only two ESWS trains OPERABLE	Reflection of highly redundancy of trains	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (31/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	A1 NOTES Enter applicable and Required Actions of LCO 3.8.1, "AC Sources - Operating," for emergency diesel generator made inoperable by SWS	Enter applicable and Required Actions of LCO 3.8.1, "AC Sources - Operating," for emergency Class 1E gas turbine generator made inoperable by ESWS.	Unique features of US-APWR	
	A1 Restore SWS train to OPERABLE status.	Restore three ESWS trains to OPERABLE status	Reflection of highly redundancy of trains	
	-	Required Action A2 Apply the requirement of Specification 5.5.18	Application of NEI 06-09	
	SR 3.7.8.2, 3.7.8.3 Frequency 18 months	24 months	24 month refueling cycle.	
3.7.9	3.7.9 Ultimate Heat Sink (UHS)	N/A	COLA	
3.7.10	3.7.10 Control Room Emergency Filtration System (CREFS)	3.7.10 Main Control Room HVAC System (MCRVS)	-	
	-	NOTE The MCRVS consists of two trains of main control room emergency filtration system (MCREFS) and four trains of main control room air temperature control system (MCRATCS).	Rename the section title due to combination with 3.7.10 and 3.7.11. MCRVS of US-APWR has both function of Filtration and air temperature control.	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (32/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	LCO, Condition about CRAEFS	Same as STS except description of D1 NOTE "protection mode if automatic transfer to toxic gas protection mode is inoperable.]. US-APWR Tech Spec doesn't have this note.	[note: We are going to bring back the description about toxic gas protection.]	
	SR 3.7.10.3, 3.7.10.4 Frequency [18 months]	24 months	24 month refueling cycle.	
3.7.11	3.7.11 Control Room Emergency Air Temperature Control System (CREATCS)	Described in 3.7.10	The requirement in 3.7.11 is combined with 3.7.10.	
	Two CREATCS trains shall be OPERABLE.	Three of four MCRATCS trains OPERABLE	Reflection of highly redundancy of trains	
	Condition A. One CREATCS train inoperable.	Condition B. Only two MCRATCS trains OPERABLE	The requirement in 3.7.11 is combined with 3.7.10. Reflection of highly redundancy of trains	
	Required Action Restore CREATCS train to OPERABLE status.	Restore three MCRATCS trains to OPERABLE status.	Reflection of highly redundancy of trains	
	-	B.2 Apply the requirement of Specification 5.5.18.	Application of NEI 06-09	
	SR 3.7.11.1 Frequency [18] months	SR 3.7.10.5 24 months	24 month refueling cycle.	
3.7.12	Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)	3.7.11 Annulus Emergency Exhaust System	Section number changed from 3.7.12 to 3.7.11. "3.7.12 ECCS Pump Room Exhaust Air Cleanup System" and "3.7.14 Penetration Room Exhaust Air Cleanup System" are	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (33/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
			combined.	
3.7.13	Fuel Building Air Cleanup System (FBACS)	N/A	US-APWR has no relevant system. The effect of purification by Iodine filter is not expected.	
3.7.14	Penetration Room Exhaust Air Cleanup System (PREACS)	3.7.11 Annulus Emergency Exhaust System	-	
	LCO, Condition	Same as the left column except system name.	Only changing of system name. Reflection of US-APWR design.	
	SR 3.7.11.3, 3.7.11.4 Frequency [18] months	24 months	24 month refueling cycle.	
	SR 3.7.11.5 [Verify one PREACS train can maintain a pressure ≤ [-0.125] inches water gauge relative to atmospheric pressure during the [post accident] mode of operation at a flow rate of ≤ [3000] cfm.	SR 3.7.11.4 Verify one Annulus Emergency Exhaust System train can maintain a pressure ≤ -0. 125 inches water gauge relative to atmospheric pressure during the accident condition at a flow rate of ≤ 5600 cfm	Reflection of US-APWR design.	
3.7.15	Fuel Storage Pool Water Level	3.7.12 Fuel Storage Pit Water Level	Only changing of system name.	
3.7.16	Fuel Storage Pool Boron Concentration]	3.7.13 Fuel Storage Pit Boron Concentration	Only changing of system name.	
3.7.17	[Spent Fuel Pool Storage]	N/A	US-APWR has no region 2 of Fuel Pool	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (34/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
			Storage.	
3.7.18	Secondary Specific Activity	3.7.14 Secondary Specific Activity Same as STS	-	
3.8	3.8 ELECTRICAL POWER SYSTEMS			
3.8.1	3.8.1 AC Sources - Operating	-	-	
	LCO	Written for 4 train Gas Turbine Generators instead of 2 train Diesel Generators	Sufficient redundancy of trains Modified configulation of ECCS	Chapter 8.3.1 Tec Rep"Qualification and Test Plan of Class 1E Gas Turbine Generator System"
	Condition A, B, C, D and F	Option to apply Risk Managed Tech Spec	Option not in STS	
	SR3.8.1.2, 10, 11, 14, 18, 19	Modified for GTG with longer start time (100s) than DG and GTG doesn't require slow starting test.	Modified configuration of ECCS	Chapter 8.3.1
	SR3.8.1.2, 8, 10, 11, 14, 18, 19	Tolerances of steady state voltage and frequency are modified.	Results from Safety Analysis	
	SR3.8.1.4	Volume of day tank is changed.	Modified configuration of ECCS	
	SR3.8.1.7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	SR Frequency is changed to 24 months	24 month refueling cycle.	
3.8.2	3.8.2 AC Sources - Shutdown	-	-	
		Reflects GTG instead of DG	Modified configuration of ECCS	Chapter 8.3.1

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (35/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
3.8.3	3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air	3.8.3 Gas-Turbine generator Fuel Oil, Lube Oil	-	
		Reflects GTG instead of DG	Modified configuration of ECCS	Chapter 9.5.4, 6, 7
3.8.4	3.8.4 DC Sources - Operating	-	-	
	LCO	Allows outage of one train without limitations	Sufficient redundancy of trains	
	Condition A	Option to apply Risk Managed Tech Spec	Option not in STS	
	Condition A	Frequency of Acton A.2 is changed to 24h	Design of US-APWR	Chapter 8.3.2
	SR3.8.4.2, 3	SR Frequency is changed to 24 months	24 month refueling cycle.	
3.8.5	3.8.5 DC Sources - Shutdown	-	-	
	Condition A	Frequency of Acton A.2 is changed to 24h	Design of US-APWR	Chapter 8.3.2
	Condition A	Option to apply Risk Managed Tech Spec	Option not in STS	
3.8.6	3.8.6 Battery Parameters	-	-	
	LCO	Reflect 4 trains vs 2	Sufficient redundancy of trains	Chapter 8.3.2
	Condition B	Frequency of Acton B.2 is changed to 24h	Design of US-APWR	
3.8.7	3.8.7 Inverters - Operating	-	-	
	LCO	Reflect 4 trains vs 2	Sufficient redundancy of trains	Chapter 8.3.1
	Condition A	Option to apply Risk Managed Tech Spec	Option not in STS	
3.8.8	3.8.8 Inverters - Shutdown	Same as 3.8.8	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (36/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
3.8.9	3.8.9 Distribution Systems - Operating	-	-	
	LCO	Refers to new table developed to identify the buses required (There are distribution systems for 4 train syatem and 2 train system) for different Conditions	Sufficient redundancy of trains	Chapter 8.3
3.8.10	3.8.10 Distribution Systems - Shutdown	-	-	
		NA	NA	
3.9	REFUELING OPERATIONS			
3.9.1	Boron Concentration	Same as STS		
3.9.2	[Unborated Water Source Isolation Valves]	Same as STS	US-APWR doesn't have analyzed a boron dilution event in MODE 6 due to strict isolation control.	
3.9.3	Nuclear Instrumentation	Nuclear Instrumentation	-	
	LCO Two source range neutron flux monitors shall be OPERABLE. AND [One source range audible [alarm] [count rate] circuit shall be OPERABLE.]	Two source range neutron flux monitors shall be OPERABLE.	One source range audible alarm counter in not necessary for operation.	
	SR 3.9.3.2 Frequency 18 months	24 months	24 month refueling cycle.	
3.9.4	Containment Penetrations	-	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (37/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	LCO a. The equipment is hatch closed and held in place by [four] bolts,	The equipment hatch is closed and held in place by [four] bolts,	-	
	LCO b. and SR 3.9.4.2 Containment Purge and Exhaust Isolation System.	Containment Purge Isolation System.	Changing of system name. Reflection of US-APWR design.	
	APPLICABILITY and Condition A Suspend movement of [recently] irradiated fuel assemblies within containment	Suspend movement of irradiated fuel assemblies within containment	Rflection of US-APWR design.	
	SR 3.9.4.2 Frequency 18 months	24 months	24 month refueling cycle.	
3.9.5	Residual Heat Removal (RHR) and Coolant Circulation - High Water Level	-	-	
	LCO One RHR loop shall be OPERABLE and in operation.	Two RHR loops shall be OPERABLE and in operation.	Rflection of US-APWR design.	
	-	--NOTE—2. One RHR pump operation is permitted, provided that decay heat is sufficiently small.	Reflection of RHR system capacity of US-APWR.	
	SR 3.9.5.1 Verify one RHR loop is in operation and circulating reactor coolant at a flow rate of ≥ [2800] gpm.	Verify two RHR loops are in operation and circulating reactor coolant at a flow rate of ≥ 2400 gpm.	Reflection of RHR system capacity of US-APWR.	
3.9.6	Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level	-	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (38/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	LCO Two RHR loops shall be OPERABLE, and one RHR loop shall be in operation.	Three RHR loops shall be OPERABLE, and in operation.	Reflection of RHR system capacity of US-APWR.	
		--NOTE—3. One or two RHR loops operation is permitted, provided that decay heat is sufficiently small.	Reflection of RHR system capacity of US-APWR.	
	Condition B Requirement B2 Initiate action to restore one RHR loop to operation.	Initiate action to restore two RHR loops to operation.	ditto	
	SR 3.9.6.1 Verify one RHR loop is in operation and circulating reactor coolant at a flow rate of ≥ [2800] gpm.	Verify two RHR loops are in operation and circulating reactor coolant at a flow rate of ≥ 2400 gpm.	Reflection of RHR system capacity of US-APWR.	
	SR 3.9.6.2 Verify correct breaker alignment and indicated power available to the required RHR pump that is not in operation.	No description in the left column.	We are going to bring back the description about breaker alignment.	Chapter 8
3.9.7	Refueling Cavity Water Level	Same as STS	-	
4.0	DESIGN FEATURES			
4.1	Site Location	Same as STS	-	
4.2	Reactor Core	-	-	
	The reactor shall contain [157] fuel assemblies.	The reactor shall contain 257 fuel assemblies.	Reflection of US-APWR design.	Chapter 4.3
	[Zircalloy or ZIRLO]	ZIRLO	Reflection of US-APWR design.	Chapter 4.2

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (39/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	4.2.2 [Control Rod] Assemblies	4.2.2 Rod Cluster Assemblies	" Rod Cluster Control Assemblies" is used in Chapter 4.2.	Chapter 4.2
	4.2.2 Number of Control rod assemblies is 48.	Number of Rod Cluster Control Assemblies is 69.	Reflection of US-APWR design.	Chapter 4.3
4.3	Fuel Storage	-	-	
	4.3.1.1 a maximum U-235 enrichment of [4.5] weight percent,	5.0 weight percent	Improvement of Core operation flexibility.	Chapter 4.2
	4.3.1.1 b keff ≤ 0.95 if fully flooded with unborated water, which includes an allowance for uncertainties as described in [Section 9.1 of the FSAR]	b. keff < 1.0 if fully flooded with unborated water, which includes an allowance for uncertainties as described in Chapter 9, and c. keff ≤ 0.95 if fully flooded with water borated to [This information will be provided by the COLA] ppm which includes an allowance for uncertainties.	The description for US-APWR is based on 10 CFR 50.68 "Criticality accident requirements".	
	4.3.1.1 [c. A nominal [9.15] inch center to center distance between fuel assemblies placed in [the high density fuel storage racks].]	d. A nominal 11.1 inch center to center distance between fuel assemblies placed in spent fuel storage racks.	Spent fuel storage pit of US-APWR has only one region.	Chapter 9.1.2
	Description from d to f	-	Spent fuel storage pit of US-APWR has only one region.	Chapter 9.1.2

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (40/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	4.3.1.2 a [4.5] weight percent,	5.0 weight percent,	Improvement of Core operation flexibility.	
	4.3.1.2 d A nominal [10.95] inch center to center distance between fuel assemblies placed in the storage racks.	A nominal 16.9 inch center distance between fuel assemblies placed in the storage racks.	Reflection of US-APWR design.	Chapter 9.1.2
	4.3.3 a storage capacity limited to no more than [1737] fuel assemblies.	900 fuel assemblies	Reflection of US-APWR design.	Chapter 9.1.1
5	ADMINISTRATIVE CONTROLS			
5.1	Responsibility	-	-	
	-	Specify COLA scope.	-	
5.2	Organization	-	-	
	-	Specify COLA scope.	-	
5.3	Unit Staff Qualifications	-	-	
	-	Specify COLA scope.	-	
5.4	Procedures	Same as STS	-	
5.5	Programs and Manuals	-	-	
5.5.1	Offsite Dose Calculation Manual (ODCM)	-	-	
	-	Specify COLA scope.	-	
5.5.2	5.5.2 Primary Coolant Sources Outside Containment	-	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (41/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	The systems include [Recirculation Spray, Safety Injection, Chemical and Volume Control, gas stripper, and Hydrogen Recombiner].	The systems include Containment Spray, Safety Injection, Chemical and Volume Control, and Sampling System].	Reflection of US-APWR design	
	b. Integrated leak test requirements for each system at least once per [18] months	Integrated leak test requirements for each system at least once per 24 months	24 month refueling cycle.	
5.5.3	Post Accident Sampling	Same as STS	-	
5.5.4 - 5.5.8		Same as STS	-	
5.5.9	Steam Generator (SG) Program	Same as STS	-	
5.5. 10	Secondary Water Chemistry Program	Same as STS	-	
5.5. 11	Ventilation Filter Testing Program (VFTP)	-	-	
	a. and b. Table ESF Ventilation System and Flow rate are blank.	Numerical data of Flow rates of Main Control Room Emergency Filtration System (MCREFS) and Annulus Emergency Exhaust System (AEES) are described.	-	
	c. Table ESF Ventilation System, Penetration, RH and Face Velocity (fps) are blank.	The parameters in the left column are described.	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (42/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	d. Table ESF Ventilation System, Delta P and Flow rate are blank.	The parameters in the left column are described.	-	
5.5.12	[Waste Gas Holdup System], [gas storage tanks or fed into the offgas treatment system].	Gaseous Waste Management System gas storage tanks	Reflection of US-APWR design	
5.5.13	Diesel Fuel Oil Testing Program	Gas Turbine Generator Fuel Oil Testing Program	US-APWR unique design	
5.5.14	Technical Specifications (TS) Bases Control Program	Same as STS	-	
5.5.15	Safety Function Determination Program (SFDP)	Same as STS	-	
5.5.16	Containment Leakage Rate Testing Program	-	-	
	Some options are described.	Option B is selected.	-	
	b. Pa, is [45 psig]. The containment design pressure is [50 psig]	b. Pa, is 57.5 psig The containment design pressure is 68 psig.	Numerical values are from Chapter 6.	Chapter 6
	c. La at Pa shall be [ ] % of containment air weight per day.	, La, at Pa, shall be 0.10 % of containment air weight per day.	Safety Analyses confirm suitability.	Chapter 15
5.5.17	Battery Monitoring and Maintenance Program	Same as STS	-	
5.5.18	N/A	Configuration Risk Management Program (CRMP)	Application of NEI 06-09	
5.6	Reporting Requirements			

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (43/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
5.6.1	Annual Radiological Environmental Operating Report	Same as STS	-	
5.6.2	Radioactive Effluent Release Report	Same as STS	-	
5.6.3	CORE OPERATING LIMITS REPORT (COLR)	-	-	
	The individual specifications and relevant reports are not described.	The individual specifications and relevant reports are referenced.	Reflection of US-APWR design	
5.6.4	Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)	-	-	
	a. LTOP arming, and PORV lift settings	"LTOP arming, and PORV lift settings" is deleted.	US-APWR doesn't have PORV.	
	The individual specifications that address RCS pressure and temperature limits are not described.	The individual specifications are referred.	Reflection of US-APWR design	
	b. The documents that describe the analytical methods.	Chapter 5 is referred.	Reflection of US-APWR design	
5.6.5	Post Accident Monitoring Report	-	-	

Table 2-1 Justification for Deviations between STS and US-APWR Technical Specifications (44/44)

	STS (NUREG-1431)	US-APWR	Justification	Reference (US-APWR TS chapter Number)
	When a report is required by Condition B or F of LCO 3.3.[3], "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days.	When a report is required by Condition B of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days.	Reflection of US-APWR design	
5.7	[High Radiation Area]	Same as STS.	-	

3.0 CONCLUSIONS

The deviations between STS and the US-APWR Technical Specifications are described and justification of the deviations is explained.