AST/EPU Potential Relationship Table

AST Category	Potential Relationship Area	AST LAR	EPU LAR
Dose Consequence Analysis	Loss of Coolant Accident	• EPU Power Level assumed • Used conservative input assumptions that bound current and EPU conditions consistent with RG 1.183 (no tie to EPU LAR)	• Reference to AST for radiological consequences
	Steam Generator Tube Rupture	• EPU Power Level assumed • Used conservative input assumptions that bound current and EPU conditions consistent with RG 1.183 (no tie to EPU LAR) • Supplemental analysis presented in response to RAI to confirm no SG overfill and conservatism of 30 minute isolation assumption	• Reference to AST for radiological consequences • Detailed overfill analysis performed
	Locked Rotor	• EPU Power Level assumed • Used conservative input assumptions that bound current and EPU conditions consistent with RG 1.183 (no tie to EPU LAR) • Exception was assumption of rods in DNB which was changed from 100% to 30% based on RAVE analysis)	• Reference to AST for radiological consequences
	Main Steam Line Break	• EPU Power Level assumed • Used conservative input assumptions that bound current and EPU conditions consistent with RG 1.183 (no tie to EPU LAR)	• Reference to AST for radiological consequences
	Control Rod Drive Ejection	• EPU Power Level assumed • Used conservative input assumptions that bound current and EPU conditions consistent with RG 1.183 (no tie to EPU LAR)	• Reference to AST for radiological consequences
	Reactor Vessel Head Drop	• EPU Power Level assumed	• Reference to AST for radiological consequences
	Fuel Handling Accident	• EPU Power Level assumed • Conservative gap fractions assumed	• Reference to AST for radiological consequences
Systems	Residual Heat Removal	• EPU Power Level assumed • Decay removal based on throttled flow evaluated using existing methodology	• EPU doesn't impact • EPU evaluations assume AST modifications are implemented

AST/EPU Potential Relationship Table

AST Category	Potential Relationship Area	AST LAR	EPU LAR
Systems	Containment Spray	• EPU Power Level assumed • Throttled flow evaluated for acceptability using existing methodology	• EPU doesn't impact • EPU evaluations assume AST modifications are implemented
	Auxiliary Feedwater	• Does not affect AST analyses • Conservative flow rates assumed in SGTR supplemental overfill analysis	• EPU evaluates AFW modifications and supports Technical Specifications • EPU evaluations assume AFW modifications are implemented
	Control Room Ventilation	• New operating mode developed • To address LOOP for LOCA, fans now auto loaded vs. manually loaded on EDGs • Modifications being implemented to address single active failures • System upgraded to Augmented Quality • Included in Maintenance and License Renewal Scope	• EPU doesn't impact • EPU evaluations assume AST modifications are implemented
	Auxiliary Building Ventilation	• EPU Power Level assumed • Modifications being implemented to address single active failures • System upgraded to Augmented Quality • New Technical Specifications Proposed • Included in Maintenance and License Renewal Scope	• EPU doesn't impact • EPU evaluations assume AST modifications are implemented
	Emergency Diesel Generators	• Impact of auto loading of Control Room Ventilation fans addressed by removing an existing non-essential load which is larger • No impact of Auxiliary Building ventilation fans because they will be integrated into the load management program • No impact on Fuel Consumption because analysis based on EDGs operating at the 200 hour rating	• EPU evaluations assume AST and EPU modifications are implemented • Overall onsite electrical system evaluated utilizing ETAP model

AST/EPU Potential Relationship Table

AST Category	Potential Relationship Area	AST LAR	EPU LAR
Other	Environmental Qualification	• EQ still based on TID and not part of AST • Newly credited equipment (ventilation fans) will be included in EQ program as applicable • No change in containment chemical environment as a result of AST modifications	• EQ addressed as part of EPU LAR
	GSI 191	• No impact • Modifications will stay within current assumptions and analyses (i.e., sump recirculation flow rate not changed)	• EPU doesn't impact • Modifications will stay within current assumptions and analyses (i.e., sump recirculation flow rate not changed)

AFW Review Matrix

Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
TS 3.3.2-1, ESFAS Item 6.e, AFW Pump Suction Transfer on Suction Pressure Low TS 3.7.5, AFW TS 3.7.6, CST	Systems and Components		
	2.5.4.5	Auxiliary Feedwater	Subject LR Section
	2.4.1	Reactor Protection, Safety Features Actuation, and Control Systems	Discusses AFW associated setpoints and controls
	2.11.1	Human Factors	Discusses control room changes for AFW.
	2.2.4	Safety-Related Valves and Pumps	Discusses safety-related pumps and valves.
	2.5.4.2	Station Service Water System	Discusses AFW interface changes.
	2.3.2	Offsite Power System	Discusses impact of AFW modifications on electrical system.
	2.3.3	AC Onsite Power System	Discusses impact of AFW modifications on electrical system.
	2.5.7.1	Emergency Diesel Fuel Oil Storage and Transfer	Does not specifically discuss AFW, however does discuss increase on fuel consumption due to increase in EDG load
	2.3.4	DC Onsite Power System	Discusses impact of AFW modifications on electrical system.
	2.7.6	Engineered Safety Feature Ventilation System	Discusses AFW room ventilation.
	2.7.5	Auxiliary and Radwaste Area and Turbine Areas Ventilation Systems	Discusses PAB ventilation – location of new AFW pumps.
	Safety Analyses		
	2.6.3.2	Mass and Energy Release Analysis for Secondary System Pipe Ruptures	Discusses transients that credit new AFW system.
	2.6.1	Primary Containment Functional Design	New AFW configuration used in analysis.
	2.8.5	Accident and Transient Analysis	Discusses AFW input to accident analyses.
	2.8.5.2.2	Loss of Non-Emergency AC Power to the Station Auxiliaries	Discusses transients that credit new AFW system.
	2.8.5.2.3	Loss of Normal Feedwater Flow	Discusses transients that credit new AFW system.
	2.8.5.6.2	Steam Generator Tube Rupture	Discusses transients that credit new AFW system.
	2.8.5.6.3.3	Technical Evaluation – SBLOCA	Discusses transients that credit new AFW system.
	2.3.5	Station Blackout	Discusses transients that credit new AFW system.
	2.8.5.7	Anticipated Transients Without Scram	Discusses transients that credit new AFW system.
	2.5.1.2.1	Internally Generated Missiles	Addresses internally generated missiles for SR equipment.

AFW Review Matrix

Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
TS 3.3.2-1, ESFAS Item 6.e, AFW Pump Suction Transfer on Suction Pressure Low TS 3.7.5, AFW TS 3.7.6, CST	Programs/Other		
	2.3.1	Environmental Qualification of Electrical Equipment	Discusses EQ requirements.
	2.5.1.4	Fire Protection	Discusses conditions that credit new AFW system.
	2.13.1	Risk Evaluation	Discusses AFW modifications to enhance PRA

RPS/ESFAS Review Matrix

Cat	Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
A	TS 3.3.1, Reactor Protection System (RPS) Instrumentation: • Function 2b, Power Range Neutron Flux Low • Function 3, Intermediate Range Neutron Flux • Function 7.b, Pressurizer Pressure High • Function 8, Pressurizer Water Level High • Function 14, SG Water Level Low • Function 17a, Intermediate Range Neutron Flux, P-6 • Function 17b(1), Low Power Reactor Trip Block P-7, Power Range Neutron Flux • Function 17b(2), Low Power Reactor Trip Block P-7, Turbine Impulse Pressure • Function 17e, Power Range Neutron Flux P-10	2.4.1 Appendix E	Reactor Protection, Engineered Safety Features and Control Systems Supplement to LR Section 2.4.1	Associated with all setpoints. Provides methodology for setpoints.
	TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation: • Function 1c, Safety Injection - Containment Pressure High • Function 1d, Safety Injection – Pressurizer Pressure Low • Function 2c, Containment Spray – Containment Pressure High High • Function 4c, Steam Line Isolation – Containment Pressure High High • Function 5.b, Feedwater Isolation – SG Water Level High • Function 8, SI Block – Pressurizer Pressure	2.4.1 Appendix E	Reactor Protection, Engineered Safety Features and Control Systems Supplement to LR Section 2.4.1	Associated with all setpoints. Provides methodology for setpoints.

RPS/ESFAS Review Matrix

Cat	Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
B	All	2.4.1	Reactor Protection, Engineered Safety Features and Control Systems	Associated with all setpoints.
		Appendix E	Supplement to LR Section 2.4.1	Provides methodology for setpoints.
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 2a, Power Range Neutron Flux High	2.8.5.4.2	Uncontrolled Rod Cluster Control Assembly Withdrawal at Power	New value used in analysis.
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 13, Steam Generator Water Level Low Low	2.8.5.2.3	Loss of Normal Feedwater Flow	Related to TS 3.3.1 Function 13. New value used in the analysis.
			Loss of AC	
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 17c, Power Range Neutron Flux P-8	2.8.5.3	Decrease in Reactor Coolant System Flow	LR section discusses change of P-8 setpoint.
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 17d, Power Range Neutron Flux P-9	2.4.2.1	Plant Operability (Margin to Trip)	LR discusses analysis using P-9 input.
	TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Function 4d, Steam Line Isolation – High Steam Flow Coincident with Safety Injection and Tavg Low	2.5.1.3	Steam Line Break Outside Containment	LR section describes analysis results for steam line failures outside containment.
	TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Function 4e, Steam Line Isolation – High High Steam Flow Coincident with Safety Injection	2.8.5.1.2	Steam System Piping Failures Inside and Outside Containment	Related to TS 3.3.2 Function 4.e.
		2.5.1.3	Steam Line Break Outside Containment	
	TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Function 6b, Auxiliary Feedwater on SG Water Level Low Low	2.8.5.2.2	Loss of Non-Emergency AC Power to Station Auxiliaries	Related to TS 3.3.2 Function 6.b.
		2.8.5.2.3	Loss of Normal Feedwater Flow	Related to TS 3.3.2 Function 6.b
		2.2.2.5	Steam Generators and Supports	SG Modifications affect level setpoints (AFW on SG Water Level-Low Low) Function 6b

RPS/ESFAS Review Matrix

Cat	Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
C	All	2.4.1	Reactor Protection, Engineered Safety Features and Control Systems	Associated with all setpoints.
		Appendix E	Supplement to LR Section 2.4.1	Provides methodology for setpoints.
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 5, Overtemperature ΔT	2.8.5	Accident and Transient Analysis	Associated with Functions 5 and 6 – non-LOCA analysis related.
		2.8.5.6.2	Steam Generator Tube Rupture	Supplemental margin to overfill and supplemental input to dose analyses model Function 5 and 7a, but reactor trips on OTDT.
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 6, Overpower ΔT	2.8.5	Accident and Transient Analysis	Associated with Functions 5 and 6 – non-LOCA analysis related.
	TS 3.3.1, Reactor Protection System (RPS) Instrumentation, Function 7a, Pressurizer Pressure Low	2.8.5.6.2	Steam Generator Tube Rupture	Supplemental margin to overfill and supplemental input to dose analyses model Function 5 and 7a, but reactor trips on OTDT.
		2.4.2.1	Plant Operability (Margin to Trip)	Associated with TS 3.3.1, Functions 7.a and 7.b.
		2.4.2.2	Pressurizer Control Component Sizing	Associated with TS 3.3.1, Functions 7.a and 7.b.
	TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Function 1e, Safety Injection – Steam Line Pressure Low	2.8.5.1.2	Steam System Piping Failures Inside and Outside Containment	Associated with TS 3.3.2, Function 1.e.
		2.4.2.1	Plant Operability (Margin to Trip)	Associated with TS 3.3.2, Function 1.e.
		2.4.2.2	Pressurizer Control Component Sizing	Associated with TS 3.3.2, Function 1.e.
	TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Function 6e, AFW Pump Suction Transfer on Suction Pressure Low	2.5.4.5	Auxiliary Feedwater	Associated with TS 3.3.2, Function 6.e.

Unit 1 2010 Spring Outage Modifications Review Matrix

Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
TS 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, Function 6b, Auxiliary Feedwater on SG Water Level Low Low	2.8.5.2.2	Loss of Non-Emergency AC Power to Station Auxiliaries	Related to TS 3.3.2 Function 6.b.
	2.8.5.2.3	Loss of Normal Feedwater Flow	Related to TS 3.3.2 Function 6.b
	2.2.2.5	Steam Generators and Supports	SG Modifications affect level setpoints (AFW on SG Water Level-Low Low) Function 6b
TS 3.7.3, Main Feedwater Isolation	2.5.5.4	Condensate and Feedwater	Discusses new MFIVs.
	2.6.1	Primary Containment Functional Design	MFIV closure is credited in containment integrity analysis.
	2.5.4.2	Station Component Service Water System	Discusses impact of increased Containment accident temperature on GL 96-06
	2.6.3.2	Mass and Energy Release Analysis for Secondary System Pipe Rupture	MFIV closure is credited in analysis.
	2.6.5	Containment Heat Removal	Discuss heat removal capability for revised containment analysis
	2.7.7	Other Ventilation Systems (Containment)	Discuss heat removal capability for revised containment analysis
	2.1.7	Protective Coating Systems	Discusses impact of change in Containment P/T
	2.3.1	Environmental Qualification of Electrical Equipment	Discusses impact of change in Containment P/T
	2.2.4	Safety-Related Valves and Pumps	Discusses IST changes due to addition of MFIV and closure time change for FRV
	2.11.1	Human Factors	Discusses changes to Control Room for addition of MFIV
	2.13.1	Risk Evaluation	Discusses addition of MFIV
	2.8.5.6.3.3	Technical Evaluation – SBLOCA	Models addition of MFIV
TS 3.7.1, Main Steam Safety Valves	2.8.4.2	Overpressure Protection During Power Operation	Discusses setpoint changes needed for analysis.
	2.8.5.2.1	Loss of External Electrical Load, Turbine Trip and Loss of Condenser Vacuum	Discusses setpoint changes needed for analysis.
	2.8.5	Accident and Transient Analysis	Discusses RETRAN code used for LR 2.8.5.2.1 analysis.
	2.2.4	Safety-Related Valves and Pumps	Discusses IST changes due to change in MSSV setpoints
	2.5.5.1	Main Steam	Discuss need for MSSV setpoint change
	2.8.5.6.3.3	Technical Evaluation – SBLOCA	Models new MSSV setpoints

Unit 1 2010 Spring Outage Modifications Review Matrix

Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
TS 3.4.9, Pressurizer	2.8.5.2.2	Loss of Non-Emergency AC Power to the Station Auxiliaries	EPU analysis supporting AFW changes requires revised initial pressurizer level
	2.8.5.2.3	Loss of Normal Feedwater Flow	EPU analysis supporting AFW changes requires revised initial pressurizer level
TS 3.4.10, Pressurizer Safety Valves	2.8.5.2.1	Loss of External Electrical Load, Turbine Trip and Loss of Condenser Vacuum	EPU analysis supporting MSSV TS 3.7.1 changes includes revised +2.5% PSV tolerance
	2.8.5.2.2	Loss of Non-Emergency AC Power to Station Auxiliaries	EPU analysis supporting AFW changes includes revised +2.5% PSV tolerance
	2.8.5.2.3	Loss of Normal Feedwater Flow	EPU analysis supporting AFW changes includes revised +2.5% PSV tolerance
	2.8.5	Accident and Transient Analysis	Discusses RETRAN code used for LR 2.8.5.2.1 thru 2.8.5.2.3 analyses.
RETRAN	2.8.4.2	Overpressure Protection During Power Operation	Methodology used in analysis for TS 3.7.1, Main Steam Safety Valves (MSSVs).
	2.8.5.1.2	Steam System Piping Failures Inside and Outside Containment	Methodology used in analysis for TS 3.3.2 Function 4e, Engineered Safety Featur Actuation System (ESFAS) Instrumentation – High High Steam Flow .
	2.8.5.2.1	Loss of External Electrical Load, Turbine Trip, and Loss of Condenser Vacuum	Methodology used in analysis for TS 3.7.1, Main Steam Safety Valves (MSSVs) and TS 3.4.10, Pressurizer Safety Valves.
	2.8.5.2.2	Loss of Non-Emergency AC Power to the Station Auxiliaries	Methodology used in analysis for: • TS 3.7.5, Auxiliary Feedwater • TS 3.4.9, Pressurizer • TS 3.4.10, Pressurizer Safety Valves • TS 3.3.1 Function 13, Reactor Protection System (RPS) Instrumentation – Steam Generator (SG) Water Level Low Low • TS 3.3.2 Function 6b, Engineered Safety Feature Actuation System (ESFAS) Instrumentation – SG Water Level Low Low
	2.8.5.2.3	Loss of Normal Feedwater Flow	Methodology used in analysis for: • TS 3.7.5, Auxiliary Feedwater • TS 3.4.9, Pressurizer • TS 3.4.10, Pressurizer Safety Valves • TS 3.3.1 Function 13, Reactor Protection System (RPS) Instrumentation – Steam Generator (SG) Water Level Low Low • TS 3.3.2 Function 6b, Engineered Safety Feature Actuation System (ESFAS) Instrumentation – SG Water Level Low Low

Unit 1 2010 Spring Outage Modifications Review Matrix

Licensing/Tech Spec Change	Associated LR Sections	LR Section Title	Reason
RETRAN	2.8.5.4.2	Rod Withdrawal at Power	Methodology used in analysis for: • TS 3.3.1 Function 2a, Power Range Neutron Flux High
GOTHIC	2.6.1	Primary Containment Functional Design	Methodology used in analysis for (LOCA, MSLB, & Containment Response): • TS 3.3.2 Function 1c, Engineered Safety Feature Actuation System (ESFAS) Instrumentation – Containment Pressure High • TS 3.3.2 Function 2c, Engineered Safety Feature Actuation System (ESFAS) Instrumentation – Containment Pressure High High • TS 3.3.2 Function 1d, Engineered Safety Feature Actuation System (ESFAS) Instrumentation – Pressurizer Pressure Low • TS 3.7.5, Auxiliary Feedwater
VIPRE	2.8.3	Thermal and Hydraulic Design	Methodology used in analysis section 2.8.3.2.3.5 SLB Accident
	2.8.5.1.2	Steam System Piping Failures Inside and Outside Containment	Methodology used in analysis for TS 3.3.2 Function 4e, Engineered Safety Feature Actuation System (ESFAS) Instrumentation – High High Steam Flow.
	2.8.5.4.2	Uncontrolled Rod Cluster Control Assembly Withdrawal at Power	Methodology used in analysis for: • TS 3.3.1 Function 2a, Power Range Neutron Flux High