Facility: Indian Point Unit 3 Printed: 9/14/2012

Date Of Exam: 02/11/2013

Tier	Group	RO K/A Category Points												SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2			G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	3			3	6
	2	2	2	2				1	1			1	9	2			2	4
	Tier Totals	5	5	5				4	4			4	27	5			5	10
2. Plant Systems	1	3	2	3	3	3	2	3	3	2	3	1	28	3			2	5
	2	1	1	0	1	1	1	1	1	1	1	1	10	0	2		1	3
	Tier Totals	4	3	3	4	4	3	4	4	3	4	2	38	5			3	8
3. Generic Knowledge And Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			3			2			2			2	2	1	2	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	Q#
000008 Pressurizer Vapor Space Accident / 3		X					AK2.02	Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: - Sensors and Detectors	2.7	1
000009 Small Break LOCA / 3			X				EK3.24	Knowledge of the reasons for the following responses as they apply to the small break LOCA: - ECCS throttling or termination criteria	4.1	2
000011 Large Break LOCA / 3					X		EA2.08	Ability to determine and interpret the following as they apply to a Large Break LOCA: - Conditions necessary for recovery when accident reaches stable phase	3.4	3
000015/000017 RCP Malfunctions / 4					X		AA2.08	Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions: - When to secure RCPs on high bearing temperature	3.5	76
000022 Loss of Rx Coolant Makeup / 2			X				AK3.06	Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: - RCP thermal barrier cooling	3.2	5
000022 Loss of Rx Coolant Makeup / 2					X		AA2.04	Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: - How long PZR level can be maintained within limits	3.8	77
000025 Loss of RHR System / 4	X						AK1.01	Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: - Loss of RHRS during all modes of operation	3.9	6
000025 Loss of RHR System / 4						X	2.4.9	Emergency Procedures/Plan - Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.8	81

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 3

NRC Written Examination Outline

ES-401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	Q#
000026 Loss of Component Cooling Water / 8					X		AA2.01	Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: - Location of a leak in the CCWS	2.9	7
000027 Pressurizer Pressure Control System Malfunction / 3	X						AK1.02	Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: - Expansion of liquids as temperature increases	2.8	8
000029 ATWS / 1		X					EK2.06	Knowledge of the interrelations between the ATWS and the following: - Breakers, relays, and disconnects	2.9	9
000029 ATWS / 1						X	2.1.23	Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	78
000038 Steam Gen. Tube Rupture / 3	X						EK1.03	Knowledge of the operational implications of the following concepts as they apply to the SGTR: - Natural circulation	3.9	10
000040 Steam Line Rupture - Excessive Heat Transfer / 4						X	2.1.37	Conduct of Operations - Knowledge of procedures, guidelines, or limitations associated with reactivity management.	4.6	79
000054 Loss of Main Feedwater / 4						X	2.1.20	Conduct of Operations - Ability to interpret and execute procedure steps.	4.6	11
000055 Station Blackout / 6						X	2.2.18	Equipment Control - Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	2.6	12
000056 Loss of Off-Site Power / 6				X			AA1.10	Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: - Auxiliary/emergency feedwater pump (motor driven)	3.6	4
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.03	Ability to operate and/or monitor the following as they apply to the Loss of Vital AC Instrument Bus: - Feedwater pump speed to control pressure and level in S/G	3.6	13

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	Q#
000058 Loss of DC Power / 6					X		AA2.03	Ability to determine and interpret the following as they apply to the Loss of DC Power: - DC loads lost; impact on to operate and monitor plant systems	3.9	80
000062 Loss of Nuclear Svc Water / 4						X	2.1.20	Conduct of Operations - Ability to interpret and execute procedure steps.	4.6	14
000077 Generator Voltage and Electric Grid Disturbances / 6			X				AK3.02	Knowledge of the reasons for the following responses as they apply to Generator Voltage and Electrical Grid Disturbances: - Actions contained in abnormal operating procedure for voltage and grid disturbances	3.6	15
W/E04 LOCA Outside Containment / 3					X		EA2.2	Ability to determine and interpret the following as they apply to the LOCA Outside Containment: - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.6	16
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		X					EK2.2	Knowledge of the interrelations between the Loss of Secondary Heat Sink and the following: - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.9	17
W/E11 Loss of Emergency Coolant Recirc. / 4				X			EA1.3	Ability to operate and/or monitor the following as they apply to the Loss of Emergency Coolant Recirculation: - Desired operating results during abnormal and emergency situations	3.7	18

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	Q#
000003 Dropped Control Rod / 1						X	2.2.44	Equipment Control - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.4	82
000033 Loss of Intermediate Range NI / 7			X				AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of Intermediate Range Nuclear Instrumentation: - Guidance contained in EOP for loss of intermediate-range instrumentation	3.6	19
000036 Fuel Handling Accident / 8				X			AA1.04	Ability to operate and/or monitor the following as they apply to the Fuel Handling Incidents: - Fuel handling equipment during an incident	3.1	20
000037 Steam Generator Tube Leak / 3					X		AA2.16	Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: - Pressure at which to maintain RCS during S/G cooldown	4.3	83
000068 Control Room Evac. / 8						X	2.4.34	Emergency Procedures/Plan - Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.2	21
000076 High Reactor Coolant Activity / 9		X					AK2.01	Knowledge of the interrelations between the High Reactor Coolant Activity and the following: - Process radiation monitors	2.6	22
W/E02 SI Termination / 3				X			EA2.1	Ability to determine and interpret the following as they apply to the SI Termination: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.8	23
W/E03 LOCA Cooldown - Depress. / 4							2.2.37	Equipment Control - Ability to determine operability and/or availability of safety related equipment.	4.6	84

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	Q#
W/E03 LOCA Cooldown - Depress. / 4		X					EK2.2	Knowledge of the interrelations between the LOCA Cooldown and Depressurization and the following: - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.7	24
W/E06 Inad. Core Cooling / 4	X						EK1.2	Knowledge of the operational implications of the following concepts as they apply to the Degraded Core Cooling: - Normal, abnormal and emergency operating procedures associated with Degraded Core Cooling	3.5	25
W/E10 Natural Circ. / 4					X		EA2.1	Ability to determine and interpret the following as they apply to the Natural Circulation with Steam Void in Vessel with/without RVLIS: - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.9	85
W/E14 Loss of CTMT Integrity / 5	X						EK1.3	Knowledge of the operational implications of the following concepts as they apply to the High Containment Pressure: - Annunciators and conditions indicating signals, and remedial actions associated with the High Containment Pressure	3.3	26
W/E15 Containment Flooding / 5			X				EK3.2	Knowledge of the reasons for the following responses as they apply to the Containment Flooding: - Normal, abnormal and emergency operating procedures associated with Containment Flooding	2.8	27

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
003 Reactor Coolant Pump								X				A2.05	Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Effects of VCT pressure on RCP seal leakoff flows	2.5	28
004 Chemical and Volume Control						X						K6.29	Knowledge of the effect of a loss or malfunction on the following CVCS components: - Reason for excess letdown and its relationship to CCWS	2.7	29
005 Residual Heat Removal	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: - CCWS	3.2	30
005 Residual Heat Removal		X										K2.03	Knowledge of bus power supplies to the following: - RCS pressure boundary motor-operated valves	2.7	31
006 Emergency Core Cooling						X						K6.05	Knowledge of the effect of a loss or malfunction of the following will have on the ECCS: - HPI/LPI cooling water	3.0	32
006 Emergency Core Cooling					X							K5.01	Knowledge of the operational implications of the following concepts as they apply to the ECCS: - Effects of temperatures on water level indications	2.8	33
007 Pressurizer Relief/Quench Tank	X											K1.03	Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the following systems: - RCS	3.0	34
007 Pressurizer Relief/Quench Tank											X	2.2.38	Equipment Control - Knowledge of conditions and limitations in the facility license.	4.5	87
008 Component Cooling Water	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: - SWS	3.1	35

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
010 Pressurizer Pressure Control				X								K4.03	Knowledge of PZR PCS design feature(s) and/or interlock(s) which provide for the following: - Over pressure control	3.8	36
010 Pressurizer Pressure Control							X					A1.07	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: - RCS pressure	3.7	37
012 Reactor Protection									X			A3.07	Ability to monitor automatic operation of the RPS, including: - Trip breakers	4.0	38
012 Reactor Protection				X								K4.02	Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following: - Automatic reactor trip when RPS setpoints are exceeded for each RPS function; basis for each	3.9	39
013 Engineered Safety Features Actuation				X								K4.10	Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following: - Safeguards equipment control reset	3.3	40
013 Engineered Safety Features Actuation								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - LOCA	4.8	88
022 Containment Cooling							X					A1.04	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: - Cooling water flow	3.2	42
026 Containment Spray			X									K3.01	Knowledge of the effect that a loss or malfunction of the CSS will have on the following: - CCS	3.9	43
039 Main and Reheat Steam					X							K5.08	Knowledge of the operational implications of the following concepts as they apply to the MRSS: - Effect of steam removal on reactivity	3.6	44

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
059 Main Feedwater							X					A1.03	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW System controls including: - Power level restrictions for operation of MFW pumps and valves	2.7	45
059 Main Feedwater										X		A4.03	Ability to manually operate and/or monitor in the control room: - Feedwater control during power increase and decrease	2.9	46
061 Auxiliary/Emergency Feedwater					X							K5.03	Knowledge of the operational implications of the following concepts as they apply to the AFW System: - Pump head effects when control valve is shut	2.6	47
061 Auxiliary/Emergency Feedwater								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the AFW System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of air to steam supply valve	3.2	41
061 Auxiliary/Emergency Feedwater											X	2.1.32	Conduct of Operations - Ability to explain and apply all system limits and precautions.	4.0	86
062 AC Electrical Distribution			X									K3.02	Knowledge of the effect that a loss or malfunction of the A.C. Distribution System will have on the following: - ED/G	4.1	48
062 AC Electrical Distribution								X				A2.16	Ability to (a) predict the impacts of the following malfunctions or operations on the A.C. Distribution System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Degraded system voltages	2.9	89
063 DC Electrical Distribution										X		A4.03	Ability to manually operate and/or monitor in the control room: - Battery discharge rate	3.0	49

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
064 Emergency Diesel Generator											X	2.4.3	Emergency Procedures/Plan - Ability to identify post-accident instrumentation.	3.7	50
073 Process Radiation Monitoring										X		A4.02	Ability to manually operate and/or monitor in the control room: - Radiation monitoring system control panel	3.7	51
073 Process Radiation Monitoring								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the PRM System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Detector failure	3.2	90
076 Service Water								X				A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the SWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Service water header pressure	2.7	52
076 Service Water		X										K2.01	Knowledge of bus power supplies to the following: - Service water	2.7	53
078 Instrument Air									X			A3.01	Ability to monitor automatic operation of the IAS, including: - Air pressure	3.1	54
103 Containment			X									K3.01	Knowledge of the effect that a loss or malfunction of the Containment System will have on the following: - Loss of containment integrity under shutdown conditions	3.3	55

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
001 Control Rod Drive		X										K2.05	Knowledge of bus power supplies to the following: - M/G sets	3.1	56
001 Control Rod Drive								X				A2.18	Ability to (a) predict the impacts of the following malfunctions or operations on the CRDS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Incorrect rod stepping sequence	3.8	91
002 Reactor Coolant								X				A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the RCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of heat sinks	4.3	57
002 Reactor Coolant											X	2.1.42	Conduct of Operations - Knowledge of new and spent fuel movement procedures.	3.4	92
011 Pressurizer Level Control					X							K5.15	Knowledge of the operational implications of the following concepts as they apply to the PZR LCS: - PZR level indication when RCS is saturated	3.6	58
015 Nuclear Instrumentation									X			A3.02	Ability to monitor automatic operation of the NIS, including: - Annunciator and alarm signals	3.7	59
017 In-core Temperature Monitor										X		A4.02	Ability to manually operate and/or monitor in the control room: - Temperature values used to determine RCS/RCP operation during inadequate core cooling (i.e., if applicable, average of five highest values)	3.8	60
027 Containment Iodine Removal	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the CIRS and the following systems: - CSS	3.4	61

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#
029 Containment Purge				X								K4.03	Knowledge of Containment Purge System design feature(s) and/or interlock(s) which provide for the following: - Automatic purge isolation	3.2	62
034 Fuel Handling Equipment						X						K6.02	Knowledge of the effect of a loss or malfunction of the following will have on the Fuel Handling System: - Radiation monitoring systems	2.6	63
034 Fuel Handling Equipment								X				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Dropped fuel element	4.4	93
045 Main Turbine Generator											X	2.1.27	Conduct of Operations - Knowledge of system purpose and or function.	3.9	64
086 Fire Protection							X					A1.05	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Fire Protection System controls including: - FPS lineups	2.9	65

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 3 **Form ES-401-3**

Facility	Indian Point Unit 3		Date of Exam	2/11/2013			
Category	K/A #	Topic		RO		SRO-Only	
				IR	Q#	IR	Q#
1. Conduct of Operations	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.		2.9	66		
	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.		4.3	67		
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management.		4.3	68		
	2.1.40	Knowledge of refueling administrative requirements				3.9	94
	2.1.45	Ability to identify and interpret diverse indications to validate the response of another indication				4.3	95
	Subtotal			**3**	**3**	**2**	**2**
2. Equipment Control	2.2.1	Equipment Control - Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.		4.5	69		
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.		4.0	70		
	2.2.36	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.		3.1	71		
	2.2.22	Knowledge of limiting conditions for operations and safety limits				4.7	96
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.				4.2	97
	Subtotal			**3**	**3**	**2**	**2**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO/SRO Examination Outline

Facility: Indian Pont Unit 3 **Form ES-401-3**

Facility	Indian Point Unit 3		Date of Exam	2/11/2013			
Category	K/A #	Topic		RO		SRO-Only	
				IR	Q#	IR	Q#
3. Radiological Controls	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.		3.2	72		
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc		3.4	73		
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc				2.9	98
	Subtotal			**2**	**2**	**1**	**1**
4. Emergency Procedures/plan	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.		3.7	74		
	2.4.11	Knowledge of abnormal condition procedures.		4.0	75		
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.				4.4	99
	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations				4.4	100
	Subtotal			**2**	**2**	**2**	**2**
Tier 3 Point Totals				**10**	**10**	**7**	**7**

Tier / Group	Randomly Selected K/A		Reason for Rejection
R 1/1	0000112113 Large Break LOCA	Conduct of Operations - Knowledge of facility requirements for controlling vital / controlled access.	REJECTED Generic KA is not applicable to Large Break LOCA.
R 1/1	000015A111 RCP Malfunction	Ability to operate and/or monitor the following as they apply to the Reactor Coolant Pump Malfunctions: - RCP on/off and run indicators	REJECTED This KA is evaluated during Simulator Operational Examination.
R 1/1	000058A201 Loss of DC Power	Ability to determine and interpret the following as they apply to the Loss of DC Power: - That a loss of dc power has occurred; verification that substitute power sources have come on line	REJECTED Not applicable to Indian Point 3. Unit 3 does not have any automatic swap to alternate DC source functions.
R 1/1	00WE042126 LOCA Outside Containment	Conduct of Operations - Knowledge of non-nuclear safety procedures (e.g. rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen.	REJECTED Generic KA is not applicable to LOCA Outside Containment
R 1/1	000015A120 RCP Malfunctions	Ability to operate and/or monitor the following as they apply to the Reactor Coolant Pump Malfunctions: - RCP bearing temperature indicators	RREJECTED This KA was rejectd due to overlap with SRO Only Question 76.
R 1/2	000024K302 Emergency Boration	Knowledge of the reasons for the following responses as they apply to the Emergency Boration: - Actions contained in EOP for emergency boration	REJECTED This KA overlaps with a currently selected JPM.
R 1/2	0000362140 Fuel Handling Accident	Conduct of Operations - Knowledge of refueling administrative requirements.	REJECTED Over sample, This Generic KA selected for SRO Only Question 94
R 1/2	00WE13K103 Steam Generator Over-Pressure	Knowledge of the operational implications of the following concepts as they apply to the Steam Generator Overpressure: - Annunciators and conditions indicating signals, and remedial actions associated with the Steam Generator Overpressure	REJECTED This is a Yellow Path Functional Restoration Procedure. The condition is generally corrected without entering the procedure. Not able to write a discriminatory RO Question that is not too trivial.

R 2/1	0030002314 Reactor Coolant Pump	Radiological Controls - Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	REJECTED Generic KA not applicable to the Reactor Coolant Pump System.
R-2/1	004000K134 Chemical and Volume Control	Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: - Interface between CVCS and reactor coolant drain tank; and PZR PCS	REJECTED Plant configuration NA at IPEC. KA is Not Applicable
R-2/1	0220002305 Containment Cooling	Radiological Controls - Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	REJECTED Over sample Radiation Monitors (Questions 22, 51, 63, 90, 98)
R 2/1	0390002131 Main and Reheat Steam System	Conduct of Operations - Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	REJECTED This Generic KA is evaluated during Simulator Operational Examination.
R 2/1	064000K301 Emergency Diesel Generator	Knowledge of the effect that a loss or malfunction of the ED/G System will have on the following: - Systems controlled by automatic loader	REJECTED Indian Point 3 does not have an automatic loader. KA is Not Applicable.
R 2/1	073000A403 Process Radiation Monitoring System	Ability to manually operate and/or monitor in the control room: - Check source for operability demonstration	REJECTED Overlap with SRO question 90
R 2/2	0150002416 Nuclear Instrumentation System	Emergency Procedures/Plan - Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, severe accident management guidelines.	REJECTED Generic KA only applicable to ATWS condition at Indian Point. This would be overlap with SRO question 78
R 2/2	033000A301 Spent Fuel Pool Cooling	Ability to monitor automatic operation of the Spent Fuel Pool Cooling System, including: - Temperature control valves	REJECTED Indian Point 3 does not have automatic temperature control valves.

R 3	1940012144 Conduct or Operations	Conduct of Operations - Knowledge of RO duties in the CR during fuel handling, such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the CR in support of fueling operations, and supporting instrumentation.	REJECTED At Indian Point 3 the ROs in the control room respond to plant alarms as necessary. All other activities are performed by refueling team members not necessarily any RO
R 3	1940012305	Radiological Controls - Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	REJECTED Overlap with SRO Question 98.
S 1/1	000029A206 Anticipated Transient Without Scram (ATWS)	Ability to determine and interpret the following as they apply to a ATWS: - Main turbine trip switch position indication	REJECTED Equipment (Main Turbine Trip Switch) does not exist at IPEC.
S 1/1	0000652105 Loss of Instrument Air	Conduct of Operations - Ability to use procedures related to shift staffing such as minimum crew compliment, overtime limitations, etc.	REJECTED Generic KA is not applicable to Loss of Instrument Air
S 1/1	00WE042220 LOCA Outside Containment	Equipment Control - Knowledge of the process for managing troubleshooting activities.	REJECTED Generic KA is not applicable to LOCA Outside Containment
S 1/1	0000112104 Large Break LOCA	Conduct of Operations - Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no solo" operation, maintenance of active license status, 10CFR55, etc.	REJECTED Generic KA is not applicable to Large Break LOCA
S 1/1	00WE112450 Loss of Emergency Coolant Recirculation	Emergency Procedures/Plan - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	REJECTED. This Generic KA is best evaluated during Simulator Scenarios. Not able to write a discriminatory SRO question.

S 1/2	00WE062142 Degraded Core Cooling	Conduct of Operations - Knowledge of new and spent fuel movement procedures.	REJECTED Generic KA is not applicable to Degraded Core Cooling
S 2/1	003000221 Reactor Coolant Pump	Equipment Control - Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	REJECTED Generic KA refers to subsequent step information in an SOP that requires contacting Reactor Engineering for guidance. Unable to write a discriminatory SRO question.
S 2/1	0060002141 Emergency Core Cooling System	Conduct of Operations - Knowledge of the refueling process.	REJECTED Generic KA is not applicable to Emergency Core Cooling System
S 2/2	0110002314 Pressurizer Level Control System	Radiological Controls - Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	REJECTED Generic KA is not applicable to Pressurizer Level Control System

Facility: IPEC Unit 3 Date of Examination: 2/11/2013

Examination Level: RO ☒ SRO ☐ Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M	Perform a QPTR Calculation 2.1.23 - Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation. RO – 4.3
Conduct of Operations	N	Determine Deborating Demineralizer In Service Time per 3-SOP-CVCS-4 2.1.25 - Conduct of Operations - Ability to interpret reference materials such as graphs, curves, tables etc. RO – 3.9
Equipment Control	N	Prepare a Manual Taggout of 31 Recirc Pump 2.2.13 - Equipment Control - Knowledge of tagging and clearance procedures. RO – 4.1
Radiation Control	M	Prepare a Manual Gaseous Waste Release Permit Calculation 2.3.11 - Radiological Controls - Ability to control radiation releases. RO – 3.8
Emergency Procedures/Plan		NA for ROs

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: IPEC Unit 3 Date of Examination: 2/11/2013

Examination Level: RO ☐ SRO ☒ Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M	Review a QPTR Calculation 2.1.23 - Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation. SRO-4.4
Conduct of Operations	N	Review Deborating Demineralizer In Service Time Calculation per 3-SOP-CVCS-4 2.1.25 - Conduct of Operations - Ability to interpret reference materials such as graphs, curves, tables etc. SRO – 4.2
Equipment Control	N	Review a Manual Taggout of 31 Recirc Pump 2.2.13 - Equipment Control - Knowledge of tagging and clearance procedures. SRO 4.3
Radiation Control	M	Review a Manual Gaseous Waste Release Permit Calculation 2.3.11 - Radiological Controls - Ability to control radiation releases. SRO – 4.3
Emergency Procedures/Plan	M	Classify E-Plan Event and Complete Part 1 Form 2.4.41 - Emergency Procedures/Plan - Knowledge of the emergency action level thresholds and classifications. SRO – 4.6

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: IPEC UNIT 3 Date of Examination: 2-7-2013

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test No.: 1

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Transfer to Hot Leg Recirculation 000011A.1.11 RO-4.2 SRO-4.2	A, EN	2
b. Respond to Failed Open Spray Valve 000027A1.01 RO-4.0 SRO-3.9	A, N	3
c. Respond to #1 RCP Seal Failure 003000A2.01 RO-3.5 SRO-3.9	D, P	4P
d. Transfer from Low Flow Bypass Valves to Main Feed Reg Valves 059000A4.03 RO-2.9 SRO-2.9	N, L	4S
e. Start a Fan Cooler Unit 022000A4.01 RO – 3.6 SRO – 3.6	N	5
f. Bring in 13.8 KV Power 062000A4.01 RO – 3.3 SRO – 3.1	D	6
g. 33 SG Pressure Channel Fails Low (Alt Path) 035000K401 RO – 3.6 SRO – 3.8	A	7
h. Reset Rad Monitor 27 Alarm Setpoint Bantam 11 073000A402 RO – 3.7 SRO – 3.7	M	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Locally Emergency Borate 000024A104 RO – 3.6 SRO – 3.7	A, E, R	1
j. Align City Water to RHR 005000K101 RO – 3.2 SRO – 3.1	D, E, R	8
k. Secure release lineup for 31 SGDT and lineup 32 SGDT for release 071000A405 RO – 2.6 SRO – 2.6	N, R	9

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U

(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: IPEC UNIT 3 Date of Examination: 2-7-2013

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test No.: 1

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Transfer to Hot Leg Recirculation 000011A.1.11 RO-4.2 SRO-4.2	A, EN	2
b. Respond to Failed Open Spray Valve 000027A1.01 RO-4.0 SRO-3.9	A, N	3
c. Respond to #1 RCP Seal Failure 003000A2.01 RO-3.5 SRO-3.9	D, P	4P
d. Transfer from Low Flow Bypass Valves to Main Feed Reg Valves 059000A4.03 RO-2.9 SRO-2.9	N, L	4S
e. Start a Fan Cooler Unit 022000A4.01 RO – 3.6 SRO – 3.6	N	5
f. Bring in 13.8 KV Power 062000A4.01 RO – 3.3 SRO – 3.1	D	6
g. 33 SG Pressure Channel Fails Low (Alt Path) 035000K401 RO – 3.6 SRO – 3.8	A	7
h. NA SROI	M	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Locally Emergency Borate 000024A104 RO – 3.6 SRO – 3.7	A, E, R	1
j. Align City Water to RHR 005000K101 RO – 3.2 SRO – 3.1	D, E, R	8
k. Secure release lineup for 31 SGDT and lineup 32 SGDT for release 071000A405 RO – 2.6 SRO – 2.6	N, R	9

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U

(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: IPEC Unit 3 Scenario No.: 1 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: 100% power steady state. 32 AFW Pump is out of service for bearing repair. Need to have 35 SWP in service.

Turnover:
32 AFW Pumps is expected back in 6 hours. Team has been asked to reduce power to 90% for a Turbine Stop and Control Valve Test.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (BOP) N (CRS)	Perform power reduction.
2	MAL-CFW013E	C (CRS) C (ATC)	33 MFRV fails open in auto – manual available. 33 MFRV will be placed in manual to control 33 SG level.
3	MAL-CFW011	C (ALL)	NRHX Tube Leak. Letdown will be isolated and excess letdown will be placed in service.
4	MAL-EPS05B	C (CRS) C (BOP) TS (CRS)	Loss of 480V Bus 3A. 34 or 36 SWP will be started. CRS will determine T.S. shutdown is required due AFW pumps. — no S/D
5	MAL-GEN002	C (CRS) C (ATC)	Inadvertent main generator trip. Reactor will not automatically trip. Manual trip will be required.
6	MAL-CFW001C	M (ALL)	33 AFW pump will not start causing a loss of heat sink. Heat sink will be restored using condensate.
7	MAL-PRS003D	TS (CRS) C (ATC)	PORV 455C leaks by requiring isolation. CRS can be asked about TS requirements at end of scenario.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

The evaluation begins with the plant at 100% power steady state operation.

- 32 ABFP has been out-of-service for bearing oil line repair for 4 hours. It is expected back within the next 6 hours (TS 3.7.5 – 72 hr AOT). 31 and 33 ABFPs are protected equipment.
- The team has been requested to reduce power to 90% in preparation for a turbine stop and control valve test.

After the team has begun reducing reactor power, 33 Main Feed Regulating valve (FCV-417) fails open. The team will take actions per AOP-FW-1, "Loss of Feedwater" and place the MFRV in manual to control SG level.

During subsequent actions of AOP-FW-1, a leak develops in the Non-Regen heat exchanger. The team will respond per AOP-CVCS-1 and isolate Letdown.

While putting in Excess Letdown, an electrical fault occurs on 480V Bus 3A. The team will have to start an essential service water pump per AOP-480V-1. The CRS will determine that two AFW Pumps are inoperable necessitating a shutdown per T.S. 3.7.5 or safety function determination per 3.0.6.

The MTG will then trip inadvertently. The reactor will not trip automatically and will require manual trip at the flight panel. After the trip, 33 AFW Pump will not start, and one of the PORVs begins to leak by creating an isolable SBLOCA. The team will respond to the PORV failure by closing its block valve. The team will initiate performance of E-0, "Reactor Trip or Safety Injection".

Since no motor-driven AFW pump is available, the team will transition to FR-H.1, "Loss of Secondary Heat Sink" due to inadequate AFW flow.

The scenario will terminate when Condensate flow is established to the SGs

Procedure Flowpath: AOP-FW-1, AOP-CVCS-1, AOP-480V-1, E-0, FR-H.1

Critical Tasks are as follows:

E-0 - A	Manually trip reactor from the CCR before completing E-0, Step 1
E-0 - M	Close block MOV upstream of stuck-open Pzr PORV by completion of the first step in the ERG network that directs the crew to close the block MOV
FR-H.1 - A	Establish Condensate or Main Feed flow to at least one SG before 3 out 4 SG WR levels < 20%

Facility: Indian Point 3 Scenario No.: 2 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions:
Reset simulator to 5% Load Simulator Schedule-Scenario2
The Plant is in Mode 1 just above 9% power preparing to come on line.

Turnover:
Raise power to approximately 12% to place MTG in service. No equipment is out of service.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R(ATC) N(CRS) N(BOP)	Power ascension, maintain SG levels in manual.
2	MOC-SWS007	C(CRS) C(BOP) TS(CRS)	31 CCW Pump trip with failure of 32 to auto start.
3	XMT-RCS028A	I(ALL) TS(CRS)	Controlling PZR Pressure transmitter fails high.
4	MOV-CCW008	C(CRS) C(BOP)	FCV-625 spurious closure.
5	MAL-SGN005	M(ALL)	Steam leak in the Turbine Building leading to plant trip. 33 MSIV fails to close.
6	BKR-PPL003/4	C(ALL)	Entered at setup, Reactor Trip Breakers will not open causing team to enter FR-S.1.
7	RLY-PPL487/8	C(CRS) C(BOP)	Entered at setup, SI does not automatically actuate. Manual actuation will be required.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Session Outline:

The scenario begins with the plant at 5% power with no equipment is out of service. The team has been instructed to raise power to 8-10% and place MTG in service.

After taking the watch, the crew will commence raising power. After the power escalation has progressed, 31 CCW Pump will trip. The team will start another pump per ARP-010.

Following the restoration of CCW, a failure high of PT-455 will occur. The team will respond using AOP-INST-1 "Instrument or Controller Failures." The channel will be removed from service.

After the channel is removed from service, FCV-625 will go closed with no apparent reason. The team should respond per ARP-010 and re-open the valve. If the team elects to not re-open the valve, the scenario can continue.

Prior to completion of the Subsequent Actions of AOP-CCW-1, a steam break will occur in the Turbine Building. The team will attempt to manually trip the plant but the reactor trip breakers will not open.

The reactor will not trip from the Control Room and the team will respond per FR-S.1, "Response to Nuclear Power Generation / ATWS," and will shutdown the reactor by manually inserting control rods and initiating Emergency Boration. The reactor trip breakers will be locally opened after an NPO is dispatched. 33 MSIV will fail to close from the control switches. The team will proceed through FR-S.1 until transition to E-0, "Reactor Trip or Safety Injection."

After the transition to E-0 is made, the team will determine that three SGs are intact and 33 SG is faulted. The Team will also determine that SI did not automatically actuate and must manually actuate SI. The team will transition to E-2, Faulted Steam Generator Isolation and isolate 33 SG. At this point the scenario is terminated.

Procedure flow path: POP-1.3, ARP-010, AOP-INST-1, ARP-010, AOP-UC-1, E-0, FR-S.1, E-0, E-2

Critical Tasks:

CT-1 Insert negative reactivity into the core by at least one of the following methods before completing FR-S.1 step 4:

- De-energize the control rod drive MG sets
- Place rod control in manual and insert RCCAs
- Establish emergency boration flow to the RCS.

CT-2 Establish at least 686 gpm AFW flow to the SGs before completion of FR-S.1 step 3.

CT-3 Manually actuate at least one train of SIS actuated safeguards before completion of E-0 step 4.

Facility: IPEC Unit 3 Scenario No.: 3 Op-Test No.: 1

Examiners: Operators:

Initial Conditions: 34% Power IC-153

1 PORV C/L LEAKAGE

Turnover:
Raise Power to 100%.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC) N (CRS) N (BOP)	Power Increase
2	MAL-PRS006B	I (ALL) TS (CRS)	Controlling Pressurizer Level Channel fails low
3	MAL-TUR010B	I (ALL) TS (CRS)	PT-412B failure causing AMSAC to be inoperable and requiring tripping of bistables
4	MAL-RCS017A	M (ALL)	Loop Flow Transmitter penetration failure (SBLOCA)
5	MAL-CFW001A	C (BOP) C (CRS)	31 AFW Pump Trip
6	MAL-SGN005B	M (ALL)	SG Tube Leak to Rupture 32 SG

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

~~BLOCK~~ - PORV LEAK
- SPRAY FAIL X

Session Outline:

The evaluation begins with power is at 34% steady state. The crew will be directed to raise power to 100%.

After adequate power change has occurred, Pressurizer Level Channel LT-460 will fail low resulting in a loss of letdown. The crew will respond in accordance with 3-AOP-INST-1, Instrument and Controller Failures. The procedure will address both the instrumentation/Tech Spec actions and restoration of charging and letdown. This is a Tech Spec for Instrumentation.

At lead examiner discretion, PT-412B will fail low requiring bypassing AMSAC and tripping bistables. This is a Tech Spec for Instrumentation.

At lead examiner discretion, 31 Loop Flow Transmitter Penetration will fail resulting in a small break LOCA. The crew may respond using 3-AOP-LEAK-1. The crew will likely trip the reactor and manually actuate Safety Injection.

Following the Safety Injection 31 AFW pump will trip on overcurrent. This will require the crew to start 32 AFW pump to supply flow to 31 and 32 SG.

The crew will proceed through E-0 to E-1. When the crew enters E-1 a SGTR will occur in 32 SG. The crew will transition to E-3 when diagnostic check for SGTR or on Foldout page based on uncontrolled level increase.

The crew will perform actions in E-3 and transition to ECA-3.1due to LOCA with SGTR.

The scenario will be terminated when the team demonstrates they control plant Cooldown or at the lead examiners discretion.

Procedure Flowpath: POP-1.3, AOP-INST-1, AOP-INST-1, AOP-LEAK-1, E-0, E-1, E-3, ECA-3.1

Critical Tasks:

CT-1 Establish at least 365 gpm AFW flow using 32 AFW Pumps prior to exiting E-0 Step 5.

CT-2 Isolate feed to 32 SG prior to completion of E-3 Step 3.

CT-3 Initiate RCS Cooldown of <100 ^{0}F/hr to prevent SG overfill in ECA-3.1

Facility: IPEC Unit 3 Scenario No.: 4 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: 100% power steady state. 32 HHSI pump is OOS, expected to return to service in 6 hours.

Turnover: Maintain 100% Power

Event No.	Malf. No.	Event Type*	Event Description
1	MAL-MSS003	I (CRS) I(ATC)	PT-404 failure requiring manual control of Main Boiler Feed Pumps.
2	MAL-EPS005D	C (ALL) TS (CRS)	Fault on 480V Bus 6A. This will require starting an ESW pump and charging pump.
3	N/A	R (ATC) N (CRS) N (BOP)	T.S. load reduction.
4	MAL-SGN002C	I (ALL) TS (CRS)	31 SG Press Channel Fails High PT-412B failure causing AMSAC to be inoperable and requiring tripping of bistables
5	MAL-RCS001A	M (ALL)	SBLOCA
6	MAL-RPS002A/B	C (ALL)	ATWS
7	MAL-SIS001A/B	C (BOP C (CRS)	No Auto SI

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

stuck rod / Propagation rod

Summary

The evaluation begins with the plant at 100% power steady state operation. 32 SI pump is out of service for bearing inspection. 32 SI Pump was removed from service 8 hours ago, expected return in 6 hours.

After the crew assumes the watch, PT-404 Steam Header Pressure fails high. ATC diagnoses failure and places Main Boiler Feed Pump speed control to manual. CRS directs crew to perform AOP-INST-1, Instrument/Controller Failures.

Next, a fault occurs on Bus 6A. Team enters AOP-480V-1, Loss of 480 V Bus to stabilize the plant. The crew will start a charging pump, ESW Pump and determine that a shutdown must commence.

During the shutdown, 31 SG C Channel Pressure instrument will fail high causing the Atmospheric Dump Valve to go open. The crew will respond in accordance with 3-AOP-INST-1, Instrument and Controller Failures.

After sufficient shutdown, a SBLOCA occurs. Auto reactor trip is demanded but the Reactor trip breakers do not open. The reactor will not trip from the Control Room and the team will respond per FR-S.1, "Response to Nuclear Power Generation / ATWS" and will S/D the reactor by manually inserting control rods and initiating Emergency Boration via an alternate method since MOV-333 cannot be opened from the Control Room. The turbine will be manually tripped. The reactor trip breakers will be locally opened and the team will transition to E-0, "Reactor Trip or Safety Injection". The SM will declare a Site Area Emergency.

An Auto SI is required, but will not actuate. The RO will manually actuate SI. 33 SI pump cannot be powered. 32 SI pump is OOS. 31 SI pump initially starts but trips. 31 and 32 Charging Pumps are eventually started after manual action to align suction to the RWST. The team will diagnose RCS not intact and transition to EOP E-1, Loss of Reactor or Secondary Coolant.

As the team progresses through E-1, Reactor Vessel level will continue to lower. When level lowers to 44% RCP running range (after about 30 minutes following the ATWS), an orange path on core cooling will require a transition to FR-C.2, Response to Degraded Core Cooling.

The team will initiate depressurization of SGs per FR-C.2. The scenario is terminated after SG depressurization has been initiated.

Procedure Flowpath: AOP-INST-1, AOP-480V-1, AOP-INST-1, FR-S.1, EOP E-0, EOP E-1, FR-C.2

Critical Tasks are as follows:

FR-S.1 – C Insert negative reactivity into the core by at least one of the following methods before step 4 of FR-S.1 is complete:

- De-energize the Rod Drive MG Sets
- Manually insert the rods
- Establish Emergency Boration

FR-S.1 -- B Start AFW pumps and establish 686 gpm before transition out of FR-S.1

E-0 -- D Manually actuate at least one train of SIS actuated safeguards before completion of FR-S.1 step 6

FR-C.2 – A Depressurize SGs to atmospheric pressure (at < 100°F/hr) to inject ECCS accumulators and establish low-head injection flow before a Core Cooling red path develops.