

Facility: Waterford 3 (RO Exam)														Date of Exam: September 23, 2015				
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G*	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18			6	
	2	2	1	2	N/A			1	2	N/A			1	9			4	
	Tier Totals	5	4	5	N/A			4	5	N/A			4	27			10	
2. Plant Systems	1	3	2	2	3	2	3	3	2	2	3	3	28			5		
	2	1	1	1	1	1	1		1	1	1	1	10			3		
	Tier Totals	4	3	3	4	3	4	3	3	3	4	4	38			8		
3. Generic Knowledge and Abilities Categories				1		2		3		4				1	2	3	4	7
				3		2		2		3		10						

- Note:
- 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). (One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category).
 - 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.
 - Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted with justification; 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.
 - 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.
 - 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.
 - Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
 - 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.
 - 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 a category 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.
 - 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.
- G* Generic K/As

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G*	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1		X					CE/E02, EK2.2: Knowledge of the interrelations between the (Reactor Trip Recovery) 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. (CFR: 41.7 / 45.7)	3.5	1
000008 Pressurizer Vapor Space Accident / 3					X		AA2.15: Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: ESF control board, valve controls, and indicators (CFR: 43.5 / 45.13).	3.9	1
000009 Small Break LOCA / 3					X		EA2.11: Ability to determine or interpret the following as they apply to a small break LOCA: Containment temperature, pressure, and humidity (CFR 43.5 / 45.13).	3.8	1
000011 Large Break LOCA / 3						X	2.4.50: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual (CFR: 41.10 / 43.5 / 45.3).	4.2	1
000015/17 RCP Malfunctions / 4				X			AA1.03: Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Reactor trip alarms, switches, and indicators (CFR 41.7 / 45.5 / 45.6).	3.7	1
000022 Loss of Rx Coolant Makeup / 2				X			AA1.01: Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Makeup: CVCS Letdown and Charging (CFR 41.7 / 45.5 / 45.6).	3.4	1
000025 Loss of RHR System / 4						X	2.1.30: Ability to locate and operate components, including local controls (CFR: 41.7 / 45.7).	4.4	1
000026 Loss of Component Cooling Water / 8			X				AK3.04: Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: Effect on the CCW flow header of a loss of CCW (CFR 41.5, 41.10 / 45.6 / 45.13).	3.5	1
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.11: Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: RCS pressure (CFR: 43.5 / 45.13).	4.0	1
000029 ATWS / 1	X						EK1.03: Knowledge of the operational implications of the following concepts as they apply to the ATWS: Effects of boron on reactivity (CFR 41.8 / 41.10 / 45.3).	3.6	1
000038 Steam Gen. Tube Rupture / 3				X			EAL.39: Ability to operate and monitor the following as they apply to a SGTR: Drawing S/G into the RCS, using the "feed and bleed" method (CFR 41.7 / 45.5 / 45.6).	3.6	1

000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		X						CE/E05, EK2.1: Knowledge of the interrelations between the (Excess Steam Demand) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features (CFR: 41.7 / 45.7).	3.3	1
000054 (CE/E06) Loss of Main Feedwater / 4			X					CE/E06, EK3.2: Knowledge of the reasons for the following responses as they apply to the (Loss of Feedwater): Normal, abnormal and emergency operating procedures associated with (Loss of Feedwater) (CFR: 41.5 / 41.10, 45.6 / 45.13).	3.2	1
000055 Station Blackout / 6						X		2.2.37: Ability to determine operability and/or availability of safety related equipment (CFR: 41.7 / 41.7 / 43.5 / 45.12).	3.6	1
000056 Loss of Off-site Power / 6	X							AK1.03: Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of subcooling: use of steam tables to determine it (CFR 41.8 / 41.10 / 45.3).	3.1	1
000057 Loss of Vital AC Inst. Bus / 6										
000058 Loss of DC Power / 6	X							AK1.01: Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation (CFR 41.8 / 41.10 / 45.3).	2.8	1
000062 Loss of Nuclear Svc Water / 4			X					AK3.04: Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: Effect on the nuclear service water discharge flow header of a loss of CCW (CFR 41.4, 41.8 / 45.7).	3.5	1
000065 Loss of Instrument Air / 8										
W/E04 LOCA Outside Containment / 3										
W/E11 Loss of Emergency Coolant Recirc. / 4										
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4										
000077 Generator Voltage and Electric Grid Disturbances / 6		X						AK2.01: Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Motors (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8).	3.1	1
K/A Category Totals:	3	3	3	3	3	3		Group Point Total:		18/ 6

W/E15 Containment Flooding / 5											
W/E16 High Containment Radiation / 9											
BW/A01 Plant Runback / 1											
BW/A02&A03 Loss of NNI-X/Y / 7											
BW/A04 Turbine Trip / 4											
BW/A05 Emergency Diesel Actuation / 6											
BW/A07 Flooding / 8											
BW/E03 Inadequate Subcooling Margin / 4											
BW/E08; W/E03 LOCA Cooldown - Depress. / 4											
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4											
BW/E13&E14 EOP Rules and Enclosures											
CE/A11; W/E08 RCS Overcooling - PTS / 4											
CE/A16 Excess RCS Leakage / 2			x						AK3.3: Knowledge of the reasons for the following responses as they apply to the (Excess RCS Leakage): Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. (CFR: 41.5 / 41.10, 45.6, 45.13).	3.3	1
CE/E09 Functional Recovery											
K/A Category Point Totals:	2	1	2	1	2	1		Group Point Total:			9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-2		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G*	K/A Topic(s)	IR	#
003 Reactor Coolant Pump							X		X			A1.09: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: Seal flow and D/P. (CFR: 41.5 / 45.5).	2.8	1
												A3.05: Ability to monitor automatic operation of the RCPS, including: RCP lube oil and bearing lift pumps (CFR: 41.7 / 45.5).	2.7	1
004 Chemical and Volume Control	X											K1.02: Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: PZR and RCS temperature and pressure relationships (CFR: 41.2 to 41.9 / 45.7 to 45.8).	3.5	1
005 Residual Heat Removal							X					A1.03: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: Closed cooling water flow rate and temperature (CFR: 41.5 / 45.5).	2.5	1
006 Emergency Core Cooling		X				X						K2.04: Knowledge of bus power supplies to the following: ESPAS-operated valves (CFR: 41.7).	3.6	1
												K6.03: Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: Safety Injection Pumps (CFR: 41.7 / 45.7)	3.6	1
007 Pressurizer Relief/Quench Tank			X									K3.01: Knowledge of the effect that a loss or malfunction of the PRTS will have on the following: Containment (CFR: 41.7 / 45.6).	3.3	1
008 Component Cooling Water							X					A1.01: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW flow rate (CFR: 41.5 / 45.5).	2.8	1
010 Pressurizer Pressure Control						X						K6.03: Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: PZR sprays and heaters (CFR: 41.7 / 45.7).	3.2	1

012 Reactor Protection		X							X	<p>K2.01: Knowledge of bus power supplies to the following: RPS channels, components, and interconnections (CFR: 41.7).</p> <p>2.4.45: Ability to prioritize and interpret the significance of each annunciator or alarm (CFR: 41.10 / 43.5 / 45.3 / 45.12).</p>	3.3	1
013 Engineered Safety Features Actuation				X				X		<p>K5.01: Knowledge of the operational implications of the following concepts as they apply to the ESFAS: Definitions of safety train and ESF channel (CFR: 41.5 / 45.7).</p>	2.8	1
										<p>A3.01: Ability to monitor automatic operation of the ESFAS including: Input channels and logic (CFR: 41.7 / 45.5).</p>	3.7	1
022 Containment Cooling			X							<p>K4.02: Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Correlation of fan speed and flowpath changes with containment pressure (CFR: 41.7).</p>	3.1	1
025 Ice Condenser										System not part of plant design.		
026 Containment Spray								X		<p>A4.0: Ability to manually operate and/or monitor in the control room: CSS controls (CFR: 41.7 / 45.5 to 45.8).</p>	4.5	1
039 Main and Reheat Steam				X						<p>K5.05: Knowledge of the operational implications of the following concepts as they apply to the MRSS: Bases for RCS cooldown limits (CFR: 41.5 / 45.7).</p>	2.7	1
059 Main Feedwater			X							<p>K4.16: Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic trips for MFW pumps (CFR: 41.7).</p>	3.1	1
061 Auxiliary/Emergency Feedwater				X						<p>K6.01: Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners (CFR: 41.7 / 45.7).</p>	2.5	1

062 AC Electrical Distribution								X		X	A2.09: Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequences of exceeding current limitations (CFR: 41.5 / 43.5 / 45.3 / 45.13).	2.7	1
											2.2.36: Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13).	3.1	1
063 DC Electrical Distribution			X								K3.01: Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: ED/G (CFR: 41.7 / 45.6).	3.7	1
064 Emergency Diesel Generator								X		X	A2.09: Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Synchronization of the ED/G with other electric power supplies. (CFR: 41.5 / 43.5 / 45.3 / 45.13).	3.1	1
											2.1.27: Knowledge of system purpose and/or function (CFR: 41.7).	3.9	1
073 Process Radiation Monitoring	X									X	K1.01: Knowledge of the physical connections and/or cause/effect relationships between the PRM system and the following systems: Those systems served by PRMs (CFR: 41.2 to 41.9 / 45.7 to 45.8).	3.6	1
											A4.03: Ability to manually operate and/or monitor in the control room: Check source for operability demonstration (CFR: 41.7 / 45.5 to 45.8).	3.1	1
076 Service Water				X							K4.02: Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Automatic start features associated with SWS pump controls. (CFR: 41/7).	2.9	1
078 Instrument Air										X	A4.01: Ability to manually operate and/or monitor in the control room: Pressure gauges (CFR: 41.7 / 45.5 to 45.8).	3.1	1

103 Containment	X																K1.03: Knowledge of the physical connections and/or cause/effect relationships between the containment system and the following systems: Shield building vent system (CFR: 41.2 to 41.9 / 45.7 to 45.8).	3.1	1
K/A Category Point Totals:	3	2	2	3	2	3	3	2	2	3	3						Group Point Total:		28/5

071 Waste Gas Disposal			X														K3.05: Knowledge of the effect that a loss or malfunction of the Waste Gas Disposal System will have on the following: ARM and PRM systems. (CFR: 41.7 / 45.6).	3.2	1
072 Area Radiation Monitoring																			
075 Circulating Water			X														K2.03: Knowledge of bus power supplies to the following: Emergency/essential SWS pumps (CFR: 41.7).	2.6	1
079 Station Air																			
086 Fire Protection																			
K/A Category Point Totals:	1	1	1	1	1	1	1	1	0	1	1	1					Group Point Total:		10/ 3

Facility: Waterford 3 (RO)		Date of Exam: September 23, 2015				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements. (CFR: 41.10 / 45.13)	3.8	1		
	2.1.42	Knowledge of new and spent fuel movement procedures. (CFR: 41.10 / 43.7 / 45.13)	2.5	1		
	2.1.45	Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)	4.3	1		
	2.1.					
	Subtotal					
2. Equipment Control	2.2.21	Knowledge of pre- and post-maintenance operability requirements. (CFR: 41.10 / 43.2)	2.9	1		
	2.2.40	Ability to apply Technical Specifications for a system. (CFR: 41.10 / 43.2 / 43.5 / 45.3)	3.4	1		
	2.2.					
	Subtotal					
3. Radiation Control	2.3.11	Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)	3.8	1		
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)	3.4	1		
	2.3.					
	Subtotal					
4. Emergency Procedures / Plan	2.4.12	2.4.12 Knowledge of general operating crew responsibilities during emergency operations (CFR: 41.10 / 45.12)	4.0	1		
	2.4.42	Knowledge of emergency response facilities. (CFR: 41.10 / 45.11)	2.6	1		
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)	4.6	1		
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1 Question #6	000022/AA1.07	W3 does not have an excess letdown system. Randomly selected another K/A from the AA1 section of 000022. Randomly selected <u>000022 AA1.01, CVCS letdown and charging.</u>
1/1 Question #14	00055/ 2.2.39	W3 does not have one hour TS actions for a Station Blackout. Tech Specs are not addressed when in EOP space. Randomly selected a different K/A under Equipment Control (<u>2.2.37</u>) while remaining in the SBO area.
1/2 Question # 22	00036/ 2.4.1	W3 does has no EOP entry or immediate action steps for a fuel handling accident. W3 has an offnormal procedure for guidance upon a fuel handling accident. Randomly selected a different K/A under the Emergency Procedures section (<u>2.4.11</u>) while remaining in the fuel accident area.
1/2 Question # 23	00059/ AK 1.05	Calculation of offsite doses due to a release from the LWM system is not performed by a LO at W3, therefore, no guidance exist in any operations procedures. Randomly selected an Emergency or Plant Evolution from Tier 1/Group 2 limited to those not used in the original outline, then randomly selected a K/A from the AK1 area. Randomly selected <u>037 Steam Generator tube leakage AK1.01</u>
1/2 Question #27	CE/A16 AK3.1	A question could not be developed for this K/A that was supported by written guidance. The W3 RCS leak offnormal does not go into the level of detail to support this K/A. Randomly selected a different K/A for RCS leakage while staying in the AK3 area. Randomly selected <u>CE/A16 AK3.3.</u>
2/1 Question #28	003 A1.01	A question could not be developed for this K/A. The RCP off-normal does not have specific guidance that would support a test question. The W3 off-normal has guidance to get Engineering input on high vibration and actions to be taken if the SM/CRS determines that the vibration is valid. There is no trigger points nor expected mil values for the RO to take actions based on RCP vibration. Randomly selected a different K/A for the RCP system while staying in the A1 area. Randomly selected <u>003 A1.09</u>

2/1 Question #46	062 A2.08	A question could not be developed or modified for this K/A that would deviate enough from questions developed from the previous two exams. Randomly selected a different K/A for the AC electrical distribution system while staying in the A2 area. The allotment of 4 questions from the previous two exams have already been used. Randomly selected <u>062 A2.09</u>
2/1 Question #49	064 A2.16	A question could not be developed for this K/A that was supported by written guidance. W3 has a procedure for full load testing of the EDG but no guidance in the surveillance procedure to take if a loss of offsite power occurred during this testing. Randomly selected a different K/A for the EDG system while staying in the A2 area. Randomly selected <u>064 A2.09</u> .
2/1 Question #53	076 K4.06	The W3 Auxiliary Component Cooling Water (ACCW) system does not have an interlock or design feature that will separate trains. The W3 component cooling water system will separate trains and isolate safety and non safety systems. We refer to our ACCW system as the Service Water system as represented in the K/A catalog. Randomly selected a different K/A for the Service Water system while staying in the K4 area. Randomly selected <u>076 K4.02</u>
2/2 Question #61	041 K4.11	The W3 SDS system does not input to nor receive an input from the Tave/Tref program. Randomly select a system from Tier 2/ Group 2 not previously used. Randomly selected a new K4 K/A from this system. Randomly selected <u>016 K4.03</u> .
2/2 Question # 63	068/ K 5.04	Could not develop a question for Biological hazards of radiation and the resulting goal of ALARA for LWM release without selecting a theory question. Operations procedures also have not written guidance for this subject. Randomly selected a K/A from Tier 2/Group 2 system not previously used while remaining in the K5 area. Randomly selected <u>001 K5.08</u>

2/2 Question #64	071 K3.04	W3 does not have written guidance on a loss or malfunction of the waste gas disposal system having an affect on ventilation systems. The Gaseous Waste Management (GWM) system will isolate on high radiation but will not affect a ventilation system. Due to this, we were unable to develop a question that met the K/A. Randomly selected a different K/A for the Waste Gas Disposal system while staying in the K3 area. Randomly selected <u>071 K3.05</u>
3/4 Question #73	2.4.22	W3 does not have written guidance on the <u>bases</u> for prioritizing safety functions during emergency operations. Could not develop a question with an adequate LOD without having the RO prioritize safety functions in our functional recovery procedure (SRO knowledge). Randomly selected a K/A from section 2.4 ensuring not to use a 2.4 K/A already selected on this outline. Randomly selected <u>2.4.12 Knowledge of general operating crew responsibilities during emergency operations</u>
2/1 Question #42	026 A4.05	The question overlapped one of the JPMs being performed in the simulator. Randomly selected another K/A under CSS staying in the A4 field. Randomly selected <u>026 A4.01.</u>

Facility: Waterford 3 (SRO)													Date of Exam: September 23, 2015				
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	Tier Totals											27	5	5	10		
2. Plant Systems	1											28	2	3	5		
	2											10	2	1	3		
	Tier Totals											38	4	4	8		
3. Generic Knowledge and Abilities Categories					1	2	3	4	10	1	2	3	4	7			
										2	1	2	2				

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- G* Generic K/As

BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
000077 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:								Group Point Total:	18/ 6

CE/A11; W/E08 RCS Overcooling - PTS / 4						X	2.1.7: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation (CFR: 41.5 / 43.5 / 45.12 / 45.13).	4.7	1
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:							Group Point Total:		9/4

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 (CFR: 41.5 / 43.5 / 45.3 / 45.13).	3.1	1
078 Instrument Air																						
103 Containment																						
K/A Category Point Totals:																				Group Point Total:		28/ 5

086 Fire Protection																			
K/A Category Point Totals:																			
Group Point Total:																	10/		
																	3		

Facility: Waterford 3 (SRO)			Date of Exam: September 23, 2015			
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc (CFR: 41.10 / 43.5 / 45.12).			3.9	1
	2.1.8	Ability to coordinate personnel activities outside the control room (CFR: 41.10 / 45.5 / 45.12/45.13).			4.1	1
	2.1.					
	Subtotal					
2. Equipment Control	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc. (CFR: 41.10 / 43.5 / 45.13)			3.9	1
	2.2.					
	2.2.					
	Subtotal					
3. Radiation Control	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.11 / 41.12 / 43.4 / 45.9)			2.9	1
	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. (CFR: 41.12 / 43.4 / 45.9 / 45.10)			3.8	1
	2.3.					
	Subtotal					
4. Emergency Procedures / Plan	2.4.38	Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required. (CFR: 41.10 / 43.5 / 45.11).			4.4	1
	2.4.35	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects (CFR: 41.10 / 43.5 / 45.13).			4.0	1
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1 Question #1	0008 2.2.38	Not enough information in the facility license to support development of a question for a vapor space accident. Kept <u>2.2.38</u> and randomly selected a Tier1/Group 1 plant evolution not previously used. Randomly selected <u>00009 Small Break LOCA</u> .
1/1 Question #3	000022 2.2.25	The W3 basis did not have enough written information to develop a SRO type question related to the loss of Rx coolant makeup. Randomly selected a Tier 1/ Group 1 plant evolution and an Equipment Control generic K/A not previously used. Randomly selected <u>026 (Loss of Component Cooling Water)</u> and <u>2.2.12 (Knowledge of Surveillance Procedures)</u> .
1/1 Question #4	000054 AA2.04	Could not develop or modify a question for a Loss of Main Feedwater Event that would not conflict with the 2015 RO, 2012, or 2014 written exams. We have already used the allotted number of questions that were previously used in the last two NRC exams. Randomly selected a Tier 1/ Group 1 plant evolution not presently used and a K/A from the A2 field. Randomly selected <u>038 EA 2.15</u>
1/1 Question #5	000057 AA2.10	W3 has no written guidance for effects on turbine load limiter control upon a loss of vital AC instrument bus. W3 does not use an automatic system for turbine load control, therefore the turbine load limiter is not mentioned in the offnormal for a loss of Vital AC power. Randomly selected a different K/A under the same evolution in the A2 field. Randomly selected <u>AA2.19</u> .
1/2 Question #7	000003 AA2.05	W3 has no system or process for interpreting computer in-core TC map for dropped rod location. W3 has a CET map available on our QSPDS system, but this map is not used in any procedure to determine a location of a dropped CEA. Randomly selected another K/A for the same evolution and stayed with the A2 field. Randomly selected <u>AA2.01</u> .

2/1 Question #15	103 A2.05	Could not develop an SRO question for this K/A that would predict the impact of a containment entry. Randomly selected a different Tier 2/Group 1 system not being used and a different K/A while staying in the A2 field. Randomly selected <u>076 A2.02</u> Service water header pressure.
2/2 Question #16	027 A2.01	The CIRS system at W3 is the ARRS system. W3 has no guidance on the ARRS system other than starting and stopping the unit. To actuate the deluge system, the operator must only operate a pull station (RO knowledge). Randomly selected a different Tier 2/Group 2 system not being used and a different K/A while staying in the A2 field. Randomly selected <u>011 A2.01</u> Excessive letdown.
2/2 Question #18	086 A2.02	W3 does not have procedural guidance for responding to low pressure on the fire protection header. Randomly selected a different Tier 2/Group 2 system not being used and stayed in the A2 field. Randomly selected <u>033 A2.02</u> Loss of SFPCS.
3/1 Question #19	2.1.21	W3 guidance for verifying field controlled procedures is limited, mostly guidance for updating the database. RO and AO knowledge. Randomly selected another TIER 3 K/A in the Conduct of Operations section. Randomly selected <u>2.1.5</u> Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.
3/4 Question #24	2.4.8	Could not develop or modify an exam question for this K/A that would not conflict with questions on the previous two written exams and maintain this question TIER 3. Randomly selected another TIER 3 K/A in the Emergency Procedures/Plan section. Randomly selected <u>2.4.38</u> Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required.
1/1 Question # 2	2.4.9	Not in enough written guidance In W3 procedures to write an SRO test question on the difference between a LOCA at high power and low power. Randomly selected 2.4.18 for the same Emergency evolution. <u>011 2.4.18</u>

3/2 Question #20	2.1.34	Could not write an SRO question on what the primary chemistry limit is. Not enough information “below the line” that would meet the flowpath of clarification guidance for SRO questions per figure 2. Randomly selected a new K/A not previously used <u>2.1.8</u>
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Facility: Waterford 3		Date of Examination: 9/14/2015
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: 1
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A1 Conduct of Operations K/A Importance: 3.9	N, R	2.1.25, Ability to interpret reference materials, such as graphs, curves, tables, etc. Determine Spent Fuel Pool (SFP) level by alternate monitoring and calculate time to reach 212°F in the SFP per OP-901-513, SFP Cooling Malfunction.
A2 Conduct of Operations K/A Importance: 3.6	D,R	2.1.18, Ability to make accurate, clear, and concise logs, records, status boards, and reports. Perform OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data.
A3 Equipment Control K/A Importance: 3.7	P,D,R	2.2.12, Knowledge of surveillance procedures. Determine Acceptability of Containment Temperature in accordance with OP-903-001, Technical Specification Surveillance Logs, Attachments 11.1 and 11.20. (From 2012 NRC Exam)
A4 Radiation Control K/A Importance: 3.2	D,R	2.3.4, Knowledge of radiation exposure limits under normal and emergency conditions. Calculate stay time to perform a tagout verification. Room dose rate and operator's yearly dose provided
Emergency Plan		Not Selected
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* 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: <u>Waterford 3</u>		Date of Examination: <u>9/14/2015</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>1</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A5 Conduct of Operations K/A Importance: 4.6	D,R	2.1.20, Ability to interpret and execute procedure steps. Perform SM/CRS review of OP-901-501, PMC or Core Operating Limit Supervisory System Malfunction, Attachments 1, 2 and 3 following a PMC failure.
A6 Conduct of Operations K/A Importance: 3.8	D,R	2.1.18, Ability to make accurate, clear, and concise logs, records, status boards, and reports. Review and approve OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data.
A7 Equipment Control K/A Importance: 4.1	P,D,R	2.2.12, Knowledge of Surveillance Procedures Review a completed Containment Pressure calculation in accordance with OP-903-001, Technical Specification Surveillance Logs, Attachment 11.5, Containment Pressure Calculation. (From 2012 NRC Exam)
A8 Radiation Control K/A Importance: 4.3	N,R	2.3.11, Ability to Control Radiation Releases. Terminate release after review of OP-903-001, Technical Specification Surveillance Logs, Attachment 11.6, Containment Purge Cumulative Hours Calculation.
A9 Emergency Plan K/A Importance: 4.6	N,R	2.4.41, Knowledge of the emergency action level thresholds and classifications. Determine appropriate Emergency Plan EAL.
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* 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: <u>Waterford 3</u>		Date of Examination: <u>9/14/2015</u>	
Exam Level RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>1</u>	
Control Room Systems* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U			
System / JPM Title		Type Code*	Safety Function
S1	001 Control Rod Drive; ATC Operator Immediate Operator Actions on 2 Dropped CEAs from OP-901-102, CEA or CEDMCS Malfunction Fault: The first and second reactor trip options do not function, requires performance of the final reactor trip contingency from EOP OP-902-000, Standard Post Trip Actions. A2.13 ATWS RO – 4.4, SRO – 4.6	A, D, S	1
S2	004 Chemical and Volume Control System, Align Charging Pumps to discharge through HPSI Header A in accordance with OP-902-009 Appendix 30, Charging to the RCS via the HPSI Header A4.08, Charging RO – 3.8, SRO – 3.4	N,S,L	2
S3	005 Shutdown Cooling System; Place Shutdown Cooling Train A in Service Fault: After LPSI Pump A is running, SI-405A will fail closed, requiring the operator to take immediate operator actions IAW OP-901-131, Shutdown Cooling Malfunction, to secure LPSI Pump A. (Repeat from 2012 NRC Exam) A4.01 Controls and indication for RHR pumps RO – 3.6, SRO – 3.4	A,D,L,P,S	4P
S4	039 Main and Reheat Steam System; BOP operator immediate operator actions on evacuation of the Control Room in accordance with OP-901-502, Control Room Evacuation Fault: Atmospheric Dump Valve B will spuriously open, requiring the applicant to take contingency actions to control Steam Generator pressure. A4.01 Main steam supply. Valves RO – 2.9, SRO – 2.8	A,D,S	4S
S5	026 Containment Spray System Reset CSAS in accordance with OP-902-009, Standard Appendices, Section 5 – E (Repeat from 2014 NRC Exam) A4.01 CSS Controls RO – 4.5, SRO – 4.3	D,EN,P,L,S	5
S6	064 Emergency Diesel Generators Restore Power to Safety Bus 3B in accordance with OP-902-000, Standard Post Trip Actions. Fault: EDG B voltage is low out of the band preventing auto closure of the EDG B output breaker. (WF3 OE) A4.02 Adjustment of exciter voltage (using voltage control switch) RO – 3.3, SRO – 3.4	A,M,S	6

S7	015 Nuclear Instrumentation System Perform Range Check functional test of startup Channels in accordance with OP-903-101, Startup Channel Functional Test 015 A3.03, Verification of proper functioning/operability RO – 3.9, SRO – 3.9	L,D,S	7
S8	034 Fuel Handling Equipment Place the FHB Emergency Filtration Unit in service in accordance with OP-002-009, Fuel Handling Building HVAC A4.01 Radiation levels RO – 3.3, SRO – 3.7	N, S, L	8

In-Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
P1	045 Main Turbine Generator System Start an Air Side Seal Oil Pump following a loss of single train of offsite power per OP-902-009 Attachment 33-C. G2.4.6 Knowledge of EOP mitigation strategies RO – 3.7, SRO – 4.7	N,E,L	4S
P2	064 Emergency Diesel Generator (ED/G) System; Trip Emergency Diesel Generator B locally. Fault: The first method the applicant performs to trip the EDG B will fail, requiring contingency actions to secure EDG B. K4.02 Trips for ED/G while operating (normal or emergency) RO – 3.9, SRO – 4.2	A,D,R	6
P3	008 Component Cooling Water System; Restore Power to the DCT Sump Pumps Following a Loss of Off Site Power in accordance with OP-902-009, Standard Appendices G2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. RO – 4.2, SRO – 4.1	D,R,E,L	8
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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	5
(C)ontrol room			0
(D)irect from bank		≤ 9 / ≤ 8 / ≤ 4	7
(E)mergency or abnormal in-plant		≥ 1 / ≥ 1 / ≥ 1	2
(EN)gineered safety feature		≥ 1 / ≥ 1 / ≥ 1 (control room system)	1
(L)ow-Power / Shutdown		≥ 1 / ≥ 1 / ≥ 1	7
(N)ew or (M)odified from bank including 1(A)		≥ 2 / ≥ 2 / ≥ 1	4
(P)revious 2 exams		≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	2
(R)CA		≥ 1 / ≥ 1 / ≥ 1	2
(S)imulator			8

Facility: <u>Waterford 3</u>		Date of Examination: <u>9/14/2015</u>	
Exam Level RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>1</u>	
Control Room Systems: * 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U			
System / JPM Title		Type Code*	Safety Function
S1	001 Control Rod Drive; ATC Operator Immediate Operator Actions on 2 Dropped CEAs from OP-901-102, CEA or CEDMCS Malfunction Fault: The first and second reactor trip options do not function, requires performance of the final reactor trip contingency from EOP OP-902-000, Standard Post Trip Actions. A2.13 ATWS RO – 4.4, SRO – 4.6	A,D,S	1
S2			
S3			
S4			
S5	026 Containment Spray System Reset CSAS in accordance with OP-902-009, Standard Appendices, Section 5 – E (Repeat from 2014 NRC Exam) A4.01 CSS Controls RO – 4.5, SRO – 4.3	D,EN,P,L,S	5
S6	064 Emergency Diesel Generators Restore Power to Safety Bus 3B in accordance with OP-902-000, Standard Post Trip Actions. Fault: EDG B voltage is low out of the band preventing auto closure of the EDG B output breaker. (WF3 OE) A4.02 Adjustment of exciter voltage (using voltage control switch) RO – 3.3, SRO – 3.4	A,M,S	6
S7.			
S8.			

In-Plant Systems* (3 for RO);(3 for SRO-I); (3 or 2 for SRO-U)			
P1	045 Main Turbine Generator System Start an Air Side Seal Oil Pump following a loss of single train of offsite power per OP-902-009 Attachment 33-C. G2.4.6 Knowledge of EOP mitigation strategies RO – 3.7, SRO – 4.7	N,E,L	4S
P2			
P3	008 Component Cooling Water System; Restore Power to the DCT Sump Pumps Following a Loss of Off Site Power in accordance with OP-902-009, Standard Appendices G2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. RO – 4.2, SRO – 4.1	D,R,E,L	8
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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	2
(C)ontrol room			0
(D)irect from bank		≤ 9 / ≤ 8 / ≤ 4	3
(E)mergency or abnormal in-plant		≥ 1 / ≥ 1 / ≥ 1	2
(EN)gineered safety feature		≥ 1 / ≥ 1 / ≥ 1 (control room system)	1
(L)ow-Power / Shutdown		≥ 1 / ≥ 1 / ≥ 1	3
(N)ew or (M)odified from bank including 1(A)		≥ 2 / ≥ 2 / ≥ 1	2
(P)revious 2 exams		≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	1
(R)CA		≥ 1 / ≥ 1 / ≥ 1	1
(S)imulator			3

Facility: Waterford Scenario No.: 1 Op Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: Reactor power is 100%, MOC

Turnover:

Protected Train is B, AB Bus is aligned to Train B, Low Press Safety Injection (LPSI) pump A is tagged out. Perform a down power to ~90% for Heater Drain Pump 'A' planned maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC N – BOP N – SRO	Initiate a normal plant down power.
2	CH08E1	I – BOP I – SRO TS – SRO	Plant Protection System Channel D Containment Pressure (CIAS), CB-IPI-6701SMD, fails high requiring Technical Specification entry and bypass of channel trip bistables. (TS 3.3.1 & 3.3.2)
3	FW26A	I – BOP I – SRO	Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low. OP-901-201, Steam Generator Level Control Malfunction. (TRM 3.3.5)
4	RC15A1	I – ATC I – SRO TS – SRO	Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high requiring implementation of OP-901-110, Pressurizer Level Control Malfunction. (TS 3.3.3.5 & 3.3.3.6)
5	L_L10 L_M10 ED01A,B,C,D TU06 RD11A32 RD11A47	M – All	A seismic event causes a loss of offsite power and main turbine trip (auto reactor trip). Two CEAs fail to insert. (Critical Task 1, Emergency Borate using CVCS). The crew will enter OP-902-000, Standard Post Trip Actions and diagnose into OP-902-003, Loss of Offsite Power/Forced Circulation.
6	RC23A	M – All	Large RCS Cold Leg break will cause the crew to re-diagnose and enter OP-902-002, Loss of Coolant Accident Recovery Procedure.
7	RP05A3 RP05B3 RP05C3 RP05D3	I – ATC I – SRO	Containment Spray (CS) fails to AUTO Actuate requiring manual actuation. (Critical Task 2, Manually Initiate Containment Spray)
8	SI01E	C – BOP C – SRO	LPSI pump B trips requiring implementation of OP-902-008, Functional Recovery Procedure. The crew will align CS pump B to replace LPSI pump B in accordance with OP-902-009, Standard Appendices, Att. 27. (Critical Task 3, Establish LPSI flow)

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

Scenario Event Description

NRC Scenario 1

The crew assumes the shift at 100% power with instructions to perform a plant down power to ~90% in preparation for planned Heater Drain Pump 'A' maintenance. The SRO should direct the plant down power in accordance with OP-010-005, Plant Shutdown and the provided reactivity plan.

At lead examiner's discretion, CB-IPI-6701SMD, Containment Pressure (CIAS) fails high. The SRO should review Technical Specifications 3.3.1 and 3.3.2. Per Table 3.3-1 under Containment Pressure – High (Functional Unit 6) the SRO should enter Technical Specification 3.3.1 action 2. Per Table 3.3-3 under Functional Units 1b (Safety Injection, Containment Pressure-High), 3b (Containment Isolation, Containment Pressure-High), and 4c (Main Steam Line Isolation, Containment Pressure High) the SRO should enter Tech 3.3.2 action 13. The SRO should direct the BOP to bypass the Containment Pressure High (RPS) and Containment Pressure High (ESF) trip bistables (13&16) in PPS Channel D within 1 hour. The BOP should bypass the trip bistables in accordance with OP-009-007, Plant Protection System.

After the trip bistables have been placed in bypass, Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low. The Feedwater Control System will respond by increasing Feedwater flow to Steam Generator #1. The SRO should enter OP-901-201, Steam Generator Level Control Malfunction. The BOP will be required to take manual control and match Feedwater and Main Steam flow. The Ultrasonic Flow Meter will fail as a result of the instrument failure and require entry into TRM 3.3.5. Feedwater controls for Steam Generator #1 may remain in manual as a result of this failure requiring manual positioning of the valves on a Reactor Trip.

After the crew has restored Steam Generator 1 to between 50% and 70% Narrow Range, Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high. The SRO should enter OP-901-110, Pressurizer Level Control Malfunction and implement Section E1. The crew should take manual control of the Pressurizer Level Controller and/or operate Charging Pumps to restore Pressurizer level, swap control to the Channel Y level channel, and return the Pressurizer Level Controller back to AUTO. The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks. The SRO should determine that TS 3.3.3.6 requirements are met, but enter TS 3.3.3.5 Action a.

After Pressurizer Level Control is in AUTO, a seismic event causes a loss of offsite power, a main turbine trip and a reactor trip. Two CEAs fail to insert on the reactor trip. The ATC should commence Emergency Boration in accordance with OP-901-103, Emergency Boration (**CRITICAL TASK 1**). The SRO should implement OP-902-000, Standard Post Trip Actions (SPTA) and verify that the ATC has commenced emergency boration. The crew will diagnose into OP-902-003, Loss of Offsite Power/Forced Circulation.

Once the crew diagnoses OP-902-003, Loss of Offsite Power/Forced Circulation, an RCS leak occurs on RCS Cold Leg 1A that progresses to a Large Break Loss of Coolant Accident. When Containment Pressure exceeds the Containment Spray (CSAS) setpoint, Containment Spray fails to actuate. The ATC should manually initiate Containment Spray (**CRITICAL TASK 2**). The crew should re-diagnose to OP-902-002, Loss of Coolant Accident Recovery Procedure.

After the crew verifies proper operation of Component Cooling Water or at lead examiners discretion, Low Pressure Safety Injection (LPSI) pump B will trip on overcurrent. The crew should recognize that OP-902-002 safety functions are not met and the SRO should go to OP-902-008, Functional Recovery. When the SRO performs prioritization, Inventory Control (IC-2) should be the highest priority. The SRO should request TSC/Shift Manager permission and direct the BOP to align Containment Spray pump B to replace LPSI pump B and re-establish LPSI flow (**CRITICAL TASK 3**).

The scenario can be terminated after the crew has re-established low pressure safety injection flow or at the lead examiner's discretion.

CRITICAL TASKS

1. ESTABLISH REACTIVITY CONTROL

This task is satisfied by establishing emergency boration prior to exiting OP-902-000, Standard Post Trip Actions. This task becomes applicable after the reactor trips. OP-902-000, Standard Post Trip Actions, directs this as a contingency action to satisfy the Reactivity Control safety function. OP-901-103, Emergency Boration, contains the immediate operator actions required to be taken.

2. ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL

This task is satisfied by manually initiating Containment Spray Actuation Signal prior to exiting step 15 (Verify Containment Spray Actuation) of OP-902-002, Loss of Coolant Accident Recovery Procedure, or Containment pressure exceeding 44 PSIG (59 PSIA). This task becomes applicable after Containment Pressure rises above 17.7 PSIA. OP-902-000, Standard Post Trip Actions, directs this activity to satisfy the Containment Pressure and Temperature Control safety function.

3. ESTABLISH LOW PRESSURE SAFETY INJECTION

This task is satisfied by establishing low pressure safety injection using a Containment Spray pump prior to exiting the Inventory Control (IC-2) safety function in OP-902-008, Functional Recovery Procedure. This task becomes applicable after the running LPSI pump trips. OP-902-008, Functional Recovery Procedure, directs this in Inventory Control Continuing Actions with the required operator actions in OP-902-009, Standard Appendices, Attachment 27.

Scenario Quantitative Attributes

1. Malfunctions after EOP entry (1–2)	2
2. Abnormal events (2–4)	2
3. Major transients (1–2)	2
4. EOPs entered/requiring substantive actions (1–2)	2
5. EOP contingencies requiring substantive actions (0–2)	1
6. EOP based Critical tasks (2–3)	3

NRC Scenario 1

SCENARIO SETUP

- A. Reset Simulator to IC-161
- B. Verify Scenario Malfunctions and Remotes are loaded, as listed in the Scenario Timeline.
- C. Place LPSI pump A control switch in 'OFF' with a Danger tag.
- D. Place a Protected Equipment cover on LPSI pump B control switch.
- E. Place a copy of OP-010-005, Plant Shutdown, with step 9.1.6 (begin boration) circled on the BOP desk. Circle and slash the prior steps to show completion.
- F. Ensure Protected Train B sign is placed in SM office window.
- G. Verify EOOS is 10.0 Green with LPSI Pump A removed.
- H. Complete the simulator setup checklist.
- I. Start Insight, open file Crew Performance.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Plant Down Power

1. If the Senior Line Manager/Duty Plant Manager is called, acknowledge the report and inform the Control Room that you will remain in the protected area for the down power.
2. If Woodlands (Load Dispatcher) is called, acknowledge the report.

Event 2 Containment Pressure PPS Channel D (CIAS) CB-IPI-6701SMD Fails High

1. On Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 Steam Generator #1 Feedwater Flow Instrument FW-IFR-1111 Fails Low

1. On Lead Examiner's cue, initiate Event **Trigger 3**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 4 Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, Fails High

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
3. If sent to LCP-43, wait 3 minutes and report indicator RC-ILI-0110-X1 appears to be failed high. If asked to report Ch. 'Y', report value as read on Extreme View.

Event 5 Seismic Event / Loss of Offsite power / Turbine Trip / 2 Stuck CEAs

1. On Lead Examiner's cue, initiate Event **Trigger 5**.
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If requested to check Emergency Diesel Generators (EDG), wait 3 minutes and report EDGs are operating properly. Initiate event triggers 20&21 to acknowledge local annunciator panels.
4. If called as an NAO to locally close MSR temperature control valves, wait 5 minutes, initiate event trigger 22 and report all MSR temperature valves are closed.
5. If called as an NAO to align power to the DCT sump pumps, wait 5 minutes, run schedule file "Re-energize A(B) Powered DCT Sump Pumps.sch" as appropriate and make report to the Control Room after the schedule file completes all actions.
6. If called as an NAO to align Potable Water to Instrument Air compressors, wait 5 minutes, run schedule file "IA Comp A(B) Align to PW.sch" as appropriate and make report to the Control Room after the schedule file completes all actions.

Event 6/7 Large RCS Cold Leg break / Containment Spray Fails to AUTO Actuate

1. On Lead Examiner's cue, initiate Event **Trigger 6**.
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.

NRC Scenario 1

Event 8 Low Pressure Safety Injection Pump B Trips / Align CS to replace LPSI

1. On Lead Examiner's cue, initiate Event **Trigger 7**.
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.
4. If called as an NAO to investigate the trip at the breaker, report overcurrent flags on all 3 phases.
5. If called as an NAO to investigate the trip at the pump, report that there is no oil visible on the motor bearing sightglass and oil is dripping from the motor housing.
6. If called as an NAO to rack out LPSI pump B breaker or open the knife switch, wait 2 minutes, initiate event trigger 8 (SIR33) and then make report to the Control Room that you have done so.
7. If called as an NAO to place CS-125B override keyswitch in "Override", wait 2 minutes and then initiate event trigger 9 (CSR13B) to place CS-125B in override. Make report to the Control Room that you have done so.
8. If called as an NAO to locally close SI-129B, wait 3 minutes and then initiate event trigger 23 (SIR50 & SIR51) to close SI-129B. Pull up Extreme View - LP Safety Injection to check position and make report to the Control Room that you have done so.
9. **At the end of the scenario, before resetting, complete data collection by saving the file as 2015 Scenario 1-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew.**

NRC Scenario 1

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
N/A	SIR32	LPSI PUMP A BREAKER RACKED OUT (Not listed in Summary)	N/A	N/A	N/A	RKOUT
LOW PRESS SAFETY INJECTION PUMP A TAGGED OUT						
1	N/A	N/A	N/A	N/A	N/A	N/A
PLANT DOWN POWER						
2	CH08E1	CNTMT PRESS TRANSMITTER 6701 SMD FAILS HI	2	00:00:00	00:00:00	ACTIVE
CONTAINMENT PRESSURE PPS CHANNEL D (CIAS) CB-IPI-6701SMD FAILS HIGH						
3	FW26A	SG1 FEED FLOW INST FAILS LOW TO 17%	3	00:00:00	00:00:10	17%
STEAM GENERATOR #1 FEEDWATER FLOW INSTRUMENT FW-IFR-1111 FAILS LOW						
4	RC15A1	PZR LEVEL CONTROL CHANNEL, RC-ILT-0110X, FAILS HIGH	4	00:00:00	00:00:00	ACTIVE
PRESSURIZER LEVEL CONTROL CHANNEL LEVEL TRANSMITTER, RC-ILT-0110X, FAILS HIGH						
5	L_L10	SEISMIC RECORDERS IN OPERATION (Delete after 30 Seconds)	5	00:00:00	00:00:00	FAIL_ON
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	L_M10	SEISMIC EVENT	5	00:00:00	00:00:00	FAIL_ON
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	ED01A	LOSS OF OFFSITE POWER (LINE A)	5	00:00:03	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	ED01B	LOSS OF OFFSITE POWER (LINE A)	5	00:00:03	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	ED01C	LOSS OF OFFSITE POWER (LINE B)	5	00:00:07	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	ED01D	LOSS OF OFFSITE POWER (LINE B)	5	00:00:07	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						

NRC Scenario 1

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
5	TU06	TURBINE TRIP	5	00:00:07	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	RD11A32	CEA 32 MECHANICALLY STUCK	N/A	00:00:00	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	RD11A47	CEA 47 MECHANICALLY STUCK	N/A	00:00:00	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
6	RC23A	RCS COLD LEG 1A RUPTURE	6	00:00:00	00:03:00	14%
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05A3	FAILS TO TRIP CH A HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05B3	FAILS TO TRIP CH B HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05C3	FAILS TO TRIP CH C HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05D3	FAILS TO TRIP CH D HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
8	SI01E	LOSS OF LOW PRESS SAFETY INJECTION PUMP B	7	00:00:00	00:00:00	ACTIVE
LOW PRESS SAFETY INJECTION PUMP B TRIPS / ALIGN CS PUMP B TO REPLACE LPSI PUMP B						
8	SIR33	LPSI PUMP B BREAKER RACKED OUT	8	N/A	N/A	RKOUT
LOW PRESS SAFETY INJECTION PUMP B TRIPS / ALIGN CS PUMP B TO REPLACE LPSI PUMP B						
8	CSR13B	CS-125B OVERRIDE KEYSWITCH	9	N/A	N/A	OVRD
LOW PRESS SAFETY INJECTION PUMP B TRIPS / ALIGN CS PUMP B TO REPLACE LPSI PUMP B						

NRC Scenario 1

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
N/A	EGR26	EDG A LOCAL ANNUN ACK EDG A LOCAL ANNUNCIATOR PANEL	20	N/A	N/A	ACKN
N/A	EGR27	EDG B LOCAL ANNUN ACK EDG B LOCAL ANNUNCIATOR PANEL	21	N/A	N/A	ACKN
N/A	MSR43	CLOSE MSR TEMPERATURE CNTRL VALVES CLOSE MSR TEMPERATURE CNTRL VALVES	22	N/A	N/A	CLSD
N/A	SIR50	SI-129B - SDC B FCV CONTROL SI-129B - SDC B FCV CONTROL	23	N/A	N/A	LOCAL
N/A	SIR51	SI-129B - SDC B FCV POSITION SI-129B - SDC B FCV POSITION	23	00:00:05	00:00:00	0%

NRC Scenario 1

REFERENCES

Event	Procedures
1	OP-010-005, Plant Shutdown, Rev. 326 OP-002-005, Chemical and Volume Control, Rev. 47 OP-005-007, Main Turbine and Generator, Rev. 303 OP-004-004, Control Element Drive, Rev. 19
2	OP-009-007, Plant Protection System, Rev. 16 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.1 Technical Specification 3.3.2
3	OP-901-201, Steam Generator Level Control Malfunction, Rev. 6 EN-OP-115, Conduct of Operations, Rev. 15 Tech Requirement Manual 3.3.5
4	OP-901-110, Pressurizer Level Control Malfunction, Rev. 8 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.3.5 Technical Specification 3.3.3.6
5	OP-902-000, Standard Post Trip Actions, Rev. 15 OP-901-103, Emergency Boration, Rev. 3 OP-902-009, Standard Appendices, Rev. 310, Appendix 1 (Diagnostic Flow Chart), Appendix 2 (Figures)
6	OP-902-002, Loss of Coolant Accident Recovery Procedure, Rev. 19 OP-902-009, Standard Appendices, Rev. 310, Appendix 1 (Diagnostic Flow Chart), Appendix 2 (Figures)
7	EN-OP-115, Conduct of Operations, Rev. 15
8	OP-902-008, Functional Recovery Procedure, Rev. 23 OP-902-009, Standard Appendices, Rev. 310, Appendix 27 (Aligning CS to replace LPSI), and Appendix 21 (Overrides for Containment Isolation)

Facility: Waterford Scenario No.: 3 Op Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: Mode 2, Reactor Power ~1%. Two Charging Pumps in operation.

Turnover:

Protected Train is B. AB Bus is aligned to Train B. Dilute to 5-10% power.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC N – SRO	Dilute to 5-10% power, perform 100 gallon PMU addition.
2	RC22B2	I – BOP I – SRO TS – SRO	Narrow Range Safety Pressure Instrument, RC-IPT-0101B, fails low requiring TS 3.3.1 entry and bypassing of affected trip bistables.
3	CV35A CVR101	C – ATC C – BOP C – SRO	During dilution, PMU counter fails to secure flow OP-901-104, Inadvertent Positive Reactivity Addition.
4	CC01A	C – BOP C – SRO TS – SRO	Component Cooling Water Pump A trips requiring entry into OP-901-510, Component Cooling Water System Malfunction (TS 3.7.3 & Cascading).
5	RX14A	I – ATC I – SRO	Pressurizer Pressure RC-IPR-0100 X fails high, Main Spray Valves open requiring entry into OP-901-120, Pressurizer Pressure Malfunction.
6	MS13A	M – All	Main Steam Line Break outside Containment, SG 1, OP-902-004, Excess Steam Demand Recovery. (Critical Task 1, stabilize RCS temperature within P/T limits prior to lifting a PZR safety or SG safety) (Critical Task 2, stabilize RCS pressure within P/T limits and less than or equal to 1600 psid of the faulted SG prior to RCS pressure exceeding 2500 PSIA) (Critical Task 3, isolate Steam Generator #1)
7	RP08G	C – BOP C – SRO	Main Feedwater Isolation Valve Steam Generator 1, FW-184A fails to AUTO close on MSIS.

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

Scenario Event Description

NRC Scenario 3

The crew assumes the shift with the reactor at 1% power following a forced outage. The turnover will include instructions to perform RCS dilution to 5 – 10% power.

The reactivity plan will include instructions to dilute in multiple PMU batches. The initial batch will be 100 gallons of PMU. Each subsequent batch will be 50 gallons of PMU. This will allow for an observable power rise without concern for a reactor trip on the PMU failure.

After the first 100 gallons of PMU are added, Pressurizer pressure instrument, RC-IPI-0101B fails low. The ATC operator will receive the annunciators for this failure. The CRS should evaluate Tech Specs and enter Tech Spec 3.3.1 and determine that the Plant Protection System bistables for high LPD, low DNBR and high Pressurizer pressure (3, 4, & 5) must be bypassed within 1 hour on Channel B. Tech Spec 3.3.3.5 and 3.3.3.6 should be referenced but not entered.

During the second dilution, the Primary Water counter will fail to secure dilution. The ATC should attempt to secure Primary Water Flow by operating PMU-144 and CVC-510. Neither of these actions will secure flow. The CRS should enter OP-901-104, Inadvertent Positive Reactivity Addition, and secure Primary Makeup Pump A.

After these actions are completed, Component Cooling Water Pump A trips on overcurrent. The SRO should enter OP-901-510, Component Cooling Water System Malfunction, and direct the start of Component Cooling Water Pump AB to replace Component Cooling Water Pump A. The SRO should enter Technical Specification 3.7.3, TRM 3.7.3, and cascading Technical Specifications per OP-100-014, Technical Specification and Technical Requirements Compliance.

After the Tech Specs are evaluated, Pressurizer pressure instrument RC-IPR-0100 X fails high. This causes both Main Spray valves to open. The SRO should direct the ATC to take manual control and close the spray valves and enter OP-901-120, Pressurizer Pressure Malfunction. The ATC will align the non-faulted Pressurizer pressure channel.

After the Pressurizer Pressure Control Channel Y is selected, a non-isolable Main Steam line break outside Containment occurs on Main Steam Line 1, resulting in a reactor trip, Safety Injection Actuation Signal (SIAS), Containment Isolation Actuation Signal (CIAS) and Main Steam Isolation Signal (MSIS). FW-184A, Feedwater Isolation Valve A fails to close automatically on the MSIS requiring the BOP to manually close the valve. The SRO should diagnose to OP-902-004, Excess Steam Demand Recovery Procedure. The crew should take action to stabilize Reactor Coolant System temperature (**CRITICAL TASK 1**) and pressure (**CRITICAL TASK 2**) when Reactor Coolant System pressure **AND** Core Exit Thermocouple temperatures start to rise. The crew should also take action to isolate Steam Generator #1 in accordance OP-902-004, Excess Steam Demand Recovery (**CRITICAL TASK 3**).

The scenario can be terminated after the crew has isolated Steam Generator 1 or at the lead examiner's discretion.

CRITICAL TASKS

1. ESTABLISH REACTOR COOLANT SYSTEM TEMPERATURE CONTROL

This task is satisfied by taking action to stabilize Reactor Coolant System temperature within the limits of the Reactor Coolant System Pressure/Temperature Limits curve using Atmospheric Dump Valve 2 and establishing EFW flow to Steam Generator 2 prior to lifting a Pressurizer safety (2500 psia) or Steam Generator safety (1070 psig). This task becomes applicable once CET temperature and PZR pressure begin to rise following the Main Steam Line Break. Either OP-902-000, Standard Post Trip Actions or OP-902-004, Excess Steam Demand Recovery direct actions to satisfy this task.

2. ESTABLISH REACTOR COOLANT SYSTEM PRESSURE CONTROL

This task is satisfied by taking actions to stabilize RCS pressure within the limits of the Reactor Coolant System P/T curve and less than or equal to 1600 psid of the faulted steam generator by throttling HPSI flow. Action to address this task should commence prior to RCS pressure exceeding 2500 PSIA (e.g. solid plant conditions). This task becomes applicable once CET temperature and PZR pressure begin to rise following the Main Steam Line Break. Either OP-902-000, Standard Post Trip Actions or OP-902-004, Excess Steam Demand Recovery direct actions to satisfy this task.

3. ISOLATE STEAM GENERATOR #1

This task is satisfied by taking actions to isolate Steam Generator #1 in accordance with OP-902-004, Excess Steam Demand Recovery step 14. Action to address this task should commence prior to the crew indicating that step 14 is completed. This task becomes applicable once indications of an Excess Steam Demand accident are present in the simulator. OP-902-004, Excess Steam Demand Recovery directs actions to satisfy this task.

Scenario Quantitative Attributes

1. Malfunctions after EOP entry (1-2)	1
2. Abnormal events (2-4)	3
3. Major transients (1-2)	1
4. EOPs entered/requiring substantive actions (1-2)	1
5. EOP contingencies requiring substantive actions (0-2)	0
6. EOP based Critical tasks (2-3)	3

NRC Scenario 3

SCENARIO SETUP

- A. Reset Simulator to IC-163.
 - 1. Use keys 165 – 168 for S/G high level bypass setup.
- B. Verify Scenario Malfunctions and Remotes are loaded, as listed in the Scenario Timeline.
- C. Ensure Event Trigger 10 is inserted as follows (Should be loaded in IC):
 - 1. Event - PMU Pump A to STOP
 - 2. Code is ZDIFWPMUECS1357(1) == 1
- D. Ensure Protected Train B sign is placed in SM office window.
- E. Verify EOOS is 10.0 Green
- F. Place a copy of OP-010-003, Plant Startup, on CRS's desk with step 9.4.54 (raise power to 5%) circled and several of the previous steps circle-slashed to show progress. Fill in initials (and circle-slash) steps 9.4.59 (mode 1 Tech Spec logs) and 9.4.60 (Chemistry contacted) as complete. Sign step 9.4.61 (SM permission to enter mode 1).
- G. Complete the simulator setup checklist.
- H. Remove PMC point D39502 from scan (DFP).
- I. Start Insight, open file Crew Performance.tis.

NRC Scenario 3

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Dilute to 5-10% power, Perform 100 gallon PMU addition

1. If called as Chemistry to verify SG chemistry is within specification, inform the caller that SG chemistry is satisfactory. If asked for your name, say Joe Chemist.
2. If called as an NAO to open or throttle open MS-148, acknowledge the communication. Wait 5 minutes, report that you will be slowly opening/throttling MS-148, MS Supply to Gland Seal Isolation. Initiate Event **Trigger 1**. After MS-148 completes ramping, report that MS-148 is open/throttled open. If you are directed to further throttle open MS-148, simply acknowledge the request, wait ~30 seconds and report the new throttled position. Repeat as necessary until it is reported that MS-148 is fully open.
3. If called as an NAO to transfer Auxiliary Steam from Aux Boiler Steam to Main Steam, acknowledge the communication. Wait 15 minutes, and then report that Auxiliary Steam has been transferred to Main Steam (no remote necessary).
4. If called as an NAO to secure the Portable Auxiliary Boiler, acknowledge the communication. Wait 5 minutes, initiate Event **Trigger 17** and report that the Portable Aux Boiler is secured.

Event 2 Narrow Range Safety Pressure Instrument, RC-IPT-0101B, fails Low

1. After the first 100 gallon addition is completed or on Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 PMU flow malfunction

1. On Lead Examiner's cue, insert Event **Trigger 3** after the ATC has established PMU flow (second addition).
2. If called to operate valves listed in OP-901-104, acknowledge communication and report that you will work on valve list.

Event 4 Component Cooling Water Pump A Trips

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If called as the watchstander and sent to CCW Pump A, wait 3 minutes, report that the pump looks normal locally.
3. If called as the watchstander and sent to CCW Pump A breaker, wait 3 minutes, report that the breaker indicates open and that there are various breaker parts on the floor of the cubicle.
4. If Work Week Manager or PME are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 5 Pressurizer pressure instrument RC-IPR-0100 X fails High

1. On Lead Examiner's cue, initiate Event **Trigger 5**.
2. If Work Week Manager or I&C are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

NRC Scenario 3

Event 6 Main Steam Line Break outside Containment, SG 1

1. On Lead Examiner's cue, initiate Event **Trigger 6**.
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.
4. If requested to check Emergency Diesel Generators (EDG), wait 3 minutes and report EDGs are operating properly. Initiate event triggers 15 & 16 to acknowledge local annunciator panels.
5. If called as an NAO to check for steam outside, wait 2 minutes, report that a large amount of steam is issuing from the west MSIV area.

Event 7 Main Feedwater Isol Valve SG1, FW-184A, fails to AUTO close on MSIS

1. No communications should occur for this evolution.
2. **At the end of the scenario, before resetting, complete data collection by saving the file as 2015 Scenario 3-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew. Restore PMC point D39502 (RTP).**
3. After the simulator is reset, verify PMC point D39502 is in service by displaying and then escaping from the display.

NRC Scenario 3

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
1	MSR09	MS-148 MS to GS ISOL VALVE DILUTE TO RAISE POWER	1	00:00:00	00:01:00	12%
2	RC22B2	PZR CPC SAFETY, RC-IPT-0101B, FAILS LOW NR SAFETY PRESSURE INSTRUMENT, RC-IPT-0101B, FAILS LOW	2	00:00:00	00:00:00	ACTIVE
3	CV35A	MAKUP CTRLR FAILS TO ISSUE VLV CLSR WHEN BATCH COMP DURING DILUTION, PMU COUNTER FAILS TO SECURE FLOW	3	00:00:00	00:00:00	ACTIVE
3	CVR101	PMU-140 DILUTION TO CVCS PUMP SUCTION (0-100%) DURING DILUTION, PMU COUNTER FAILS TO SECURE FLOW	3	00:00:00	00:00:00	2%
3	CVR101	PMU-140 DILUTION TO CVCS PUMP SUCTION (0-100%) DURING DILUTION, PMU COUNTER FAILS TO SECURE FLOW	10	00:00:00	00:00:00	0%
4	CC01A	CCW PUMP A TRIP COMPONENT COOLING WATER PUMP A TRIP	4	00:00:00	00:00:00	ACTIVE
5	RX14A	PZR PRESSURE CNTL CHL 100 X FAIL (0-100%) (1500-2500 PSIA) PRESSURIZER PRESSURE RC-IPR-0100 X FAILS HIGH	5	00:00:00	00:00:00	100%
6	MS13A	MS A BREAK OUTSIDE CNTMT BEFORE MSIV (0-100%) NON-ISOLABLE MAIN STEAM LINE A BREAK OUTSIDE CONTAINMENT	6	00:00:00	00:00:00	6%
7	RP08G	RELAY K305 FAILED, MSIS TRAIN A (MS/FW) FW-184A (SG1 FW ISOL VLV) FAILS TO AUTO CLOSE ON MSIS	N/A	00:00:00	00:00:00	ACTIVE
N/A	EGR26	EDG A LOCAL ANNUN ACK EDG A LOCAL ANNUNCIATOR PANEL	15	N/A	N/A	ACKN
N/A	EGR27	EDG B LOCAL ANNUN ACK EDG B LOCAL ANNUNCIATOR PANEL	16	N/A	N/A	ACKN

NRC Scenario 3

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
N/A	MSR32	TEMPORARY AUX BOILER	17	N/A	N/A	OFFLINE
TEMPORARY AUX BOILER (16 MIN TILL RATED PRESS)						

NRC Scenario 3

REFERENCES

Event	Procedures
1	OP-010-003, Plant Startup, Rev. 335 OP-002-005, Chemical and Volume Control, Rev. 47
2	OP-009-007, Plant Protection System, Rev. 16 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.1
3	OP-901-104, Inadvertent Positive Reactivity Addition, Rev. 302
4	OP-901-510, Component Cooling Water Malfunction, Rev. 303 OP-100-014, TS & TRM Compliance, Rev. 328 Technical Specification 3.7.3 & Cascading Tech Requirement Manual 3.7.3
5	OP-901-120, Pressurizer Pressure Control Malfunction, Rev. 302 Technical Specification 3.2.8
6	OP-902-000, Standard Post Trip Actions, Rev. 15 OP-902-004, Excess Steam Demand Recovery Procedure, Rev. 15 OP-902-009, Standard Appendices, Rev. 310, Appendix 1 (Diagnostic Flow Chart), Appendix 2 (Figures)
7	OP-902-004, Excess Steam Demand Recovery Procedure, Rev. 15 OI-038-000, EOP Operations Expectations/Guidance, Rev. 10 EN-OP-115, Conduct of Operations, Rev. 15