

Final Submittal

(Blue Paper)

BRUNSWICK JULY-AUG EXAM - 325, 324/2007-301

FINAL JPMS

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1. ADMINISTRATIVE JPMS
2. IN-PLANT JPMS
3. SIMULATOR JPMS (CONTROL ROOM)

ES-301.

Control Room/In-Plant Systems Outline

Form ES-301-2

Facility:	Brunswick	Date of Examination:	JULY / 2007
Exam Level (circle one):	RO / SRO (U)	Operating Test No.:	NRC 2007
Control Room Systems [@] (8 for RO; 2 or 3 for SRO-U, including 1 ESF)			
	System / JPM Title	Type Code*	Safety Function
S-1	Uncoupled Control Rod During Startup	N, A, L, S	1
S-2	RCIC Failure to Isolate	N, A, S, E	5
S-3	Core Spray Pump Surveillance Min Flow Valve Failure	N, A, S	2
S-4	Restore Shutdown Cooling following a spurious isolation IAW AOP-15	N, A, L, S	4
S-5	Primary Containment Venting During Personnel Entry.	D, L, S	9
S-6	Manual Transfer of 4160 Emergency Bus Supply from the DG to the Normal Feeder IAW 00P-50.1	N, S	6
S-7	RWM failure to enforce rod blocks	D, S	7
S-8	Re-Establish RBCCW For Drywell Cooling to the Blacked Out Unit (RO) Per AOP-36.2.	D, E, S	8
In-Plant Systems [@] (3 for RO; 3 or 2 for SRO-U)			
P-1	Station Blackout: Crosstie of 4KV E-Buses	D, E	6
P-2	Control Room Evacuation IAW AOP-32, Placing the RHR Service Water System in Operation.	D, R	8
P-3	Staging the Reactor Recirc Pump Seals.	D, R	1

<p>@ 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.</p>	
* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3 4 2
(C)ontrol room	
(D)irect from bank	6 ≤ 9 / ≤ 8 / ≤ 4 3
(E)mergency or abnormal in-plant	1 ≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power / Shutdown	3 ≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	5 ≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

**2007 NRC Examination
Summary Description of JPMs**

- S-1 This is a new alternate path JPM in the Reactivity Control safety function area. The candidate will be pulling control rods for startup when a rod becomes uncoupled. Actions will be required to insert/re-couple the control rod.
- S-2 This is a new alternate path JPM in the Containment Integrity safety function area. The candidate will be placing RCIC in service when an exhaust diaphragm rupture occurs and RCIC will fail to isolate. Actions will be required to manually isolate RCIC.
- S-3 This is a new alternate path JPM in the Reactor Water Inventory Control safety function area. The candidate will be performing the Core Spray Operability Surveillance and the minimum flow valve will fail to function properly. This will require actions to prevent equipment damage.
- S-4 This a new alternate path JPM in the Heat Removal From Reactor Core Safety Function area. The candidate will be required to restore Shutdown Cooling following a spurious isolation signal IAW abnormal procedures and restart an RHRSW pump following a pump trip.
- S-5 This a bank JPM in the Radioactivity release safety function area. The candidate will be required to startup Primary Containment Ventilation during personnel entry, per 2OP-24 using both purge exhaust fans.
- S-6 This a new JPM in the Electrical safety function area. The candidate will be required to manually transfer the 4160 Emergency Bus Supply from the DG to the Normal Feeder.
- S-7 This a bank JPM in the Instrumentation safety function area. The candidate will perform a portion of the RWM operability check.
- S-8 This a bank JPM in the Plant Service System safety function area. The candidate will continue re-establishing Drywell Cooling per AOP-36.2
- P-1 This is a bank JPM in the Electrical safety function area. The candidate will be required to locally cross-tie the 4KV emergency buses following a station blackout.

- P-2 This is a bank JPM in the Plant Service System safety function area. The candidate will be required to place RHRSW inservice following a control room evacuation.
- P-3 This is a bank JPM in the Reactivity Control safety function area. The candidate will be required to place the Reactor Recirc Pump Seals in service.

Facility:		Brunswick NRC											Date of Exam:		JULY 2007								
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 *	Tot al	A2		G*	Total						
1. Emergency & Abnormal Plant Evolutions	1	5	4	1	N/A			2	4	N/A			4	20	3		4	7					
	2	2	1	2	N/A			1	1	N/A			0	7	2		1	3					
	Tier Totals	7	5	3	N/A			3	5	N/A			4	27	5		5	10					
2. Plant Systems	1	4	3	1	5	1	2	0	2	3	2	3	26	2		3		5					
	2	1	0	1	2	2	1	2	0	1	2	0	12	0	1	2		3					
	Tier Totals	5	3	2	7	3	3	2	2	4	4	3	38	3		5		8					
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1		2		3		4		7	
Note:				<p>1. Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the "Tier Totals" in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding SRO sampling.</p> <p>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 ± 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.</p> <p>3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system or evolution unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* 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. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams.</p> <p>8. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.</p> <p>9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.</p>																			

Brunswick NRC
 Written Examination Outline
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4						X	AA2.01	Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Power/flow map.....	3.8	76
295003 Partial or Complete Loss of AC / 6	X						2.1.14	Conduct of Operations: Knowledge of system status criteria which require notification of plant personnel.	3.3	77
295024 High Drywell Pressure / 5	X						2.4.31	Emergency Procedures / Plan Knowledge of annunciators alarms and indications, and use of the response instructions.	3.4	78
295025 High Reactor Pressure / 3	X						2.4.6	Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies	2.9	79
295028 High Drywell Temperature / 5						X	EA2.01	Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell Temperature	4.1	80
295030 Low Suppression Pool Water Level / 5						X	EA2.02	Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL : Suppression pool temperature.....	3.9	81
295038 High Off-site Release Rate / 9	X						2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0	82
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4						X	AA2.05	Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Jet pump operability: Not-BWR-1&2.....	3.1	39
295003 Partial or Complete Loss of AC / 6		X					AK1.03	Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : Under voltage/degraded voltage effects on electrical loads.....	2.9	40
295004 Partial or Total Loss of DC Pwr / 6	X						2.1.30	Conduct of Operations: Ability to locate and operate components, including local controls.	3.9	41
295005 Main Turbine Generator Trip / 3			X				AK2.01	Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: RPS	3.8	42
295006 SCRAM / 1						X	AA2.01	Ability to determine and/or interpret the following as they apply to SCRAM : Reactor power.....	4.5	43

Brunswick NRC
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
295016 Control Room Abandonment / 7			X				AK2.01	Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: Remote shutdown panel: Plant-Specific.....	4.4	44
295018 Partial or Total Loss of CCW / 8						X	AA2.04	Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : System flow.....	2.9	45
295019 Partial or Total Loss of Inst. Air / 8					X		AA1.01	Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Backup Air supply	3.5	46
295021 Loss of Shutdown Cooling / 4			X				AK2.03	Knowledge of the interrelations between LOSS OF SHUTDOWN COOLING and the following: RHR/shutdown cooling.....	3.6	47
295023 Refueling Acc Cooling Mode / 8			X				AK2.03	Knowledge of the interrelations between REFUELING ACCIDENTS and the following: Radiation monitoring equipment.....	3.4	48
295024 High Drywell Pressure / 5	X						2.2.25	Equipment Control Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	49
295025 High Reactor Pressure / 3	X						2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during different modes of plant operation	3.9	50
295026 Suppression Pool High Water Temp. / 5	X						2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	3.0	51
295028 High Containment Temperature / 5				X			EK3.01	Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE: Emergency depressurization	3.6	52
295028 High Drywell Temperature / 5					X		EA1.04	Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell pressure.....	3.9	53
295030 Low Suppression Pool Water Level / 5		X					EK1.01	Knowledge of the operational implications of the following concepts as they apply to LOW SUPPRESSION POOL WATER LEVEL: Steam condensation.....	3.8	54
295031 Reactor Low Water Level / 2		X					EK1.02	Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL : Natural circulation: Plant-Specific.....	3.8	55

Brunswick NRC
 Written Examination Outline
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1						X	EA2.06	Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Reactor pressure.....	4.0	56
295038 High Off-site Release Rate / 9		X					EK1.02	Knowledge of the operational implications of the following concepts as they apply to HIGH OFF-SITE RELEASE RATE : Protection of the general public	4.2	57
600000 Plant Fire On-site / 8		X					AK1.02	Knowledge of the operation applications of the following concepts as they apply to Plant Fire On Site: Fire Fighting	2.9	58
K/A Category Point Totals:	4/4	5	4	1	2	4/3	Group Point Total:			20/7

Brunswick NRC
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
295008 High Reactor Water Level / 5						X	AA2.01	Ability to determine and/or interpret the following as they apply to HIGH REACTOR WATER LEVEL : Reactor Level	3.9	83
295029 High Suppression Pool Water Level / 5	X						2.1.32	Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.8	84
295032 High Secondary Containment Area Temperature / 5						X	EA2.02	Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : Equipment operability.....	3.5	85
295010 High Drywell Pressure / 5			X				AK2.05	Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Drywell cooling and ventilation.....	3.7	59
295015 Incomplete SCRAM / 1		X					AK1.02	Knowledge of the operational implications of the following concepts as they apply to INCOMPLETE SCRAM : (CFR 41.8 to 41.10) Cooldown effects on reactor power.....	3.9	60
295020 Inadvertent Cont. Isolation / 5 & 7		X					AK1.01	Knowledge of the operational implications of the following concepts as they apply to INADVERTENT CONTAINMENT ISOLATION : Loss of normal heat sink.....	3.7	61
295022 Loss of CRD Pumps / 1					X		AA1.01	Ability to operate and/or monitor the following as they apply to LOSS OF CRD PUMPS: CRD Hydraulic System	3.1	62
295029 High Suppression Pool Water Level / 5						X	EA2.02	Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL : Reactor pressure.....	3.5	63
295033 High Secondary Containment Area Radiation Levels / 9				X			EK3.04	Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS : Personnel evacuation.....	4.0	64
295035 Secondary Containment High Differential Pressure / 5				X			EK3.01	Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE : Blow-out panel operation: Plant-Specific.....	2.8	65
K/A Category Point Total:	0/1	2	1	2	1	1/2	Group Point Total:			7/3

Brunswick NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
203000 RHR/LPCI: Injection Mode	X											2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0	86
212000 RPS									X			A2.02	Ability to (a) predict the impacts of the following on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: RPS bus power supply failure	3.9	87
215003 IRM									X			A2.01	Ability to (a) predict the impacts of the following on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Power supply degraded	3.7	88
205000 Shutdown Cooling	X											2.4.11	Emergency Procedures / Plan Knowledge of abnormal condition procedures	3.6	89
300000 Instrument Air	X											2.4.6	Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	4.0	90
203000 RHR/LPCI: Injection Mode										X		A3.09	Ability to monitor automatic operations of the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) including: Emergency generator load sequencing	3.6	1
205000 Shutdown Cooling			X									K2.02	Knowledge of electrical power supplies to the following: Motor operated valves	2.5	2
205000 Shutdown Cooling											X	A4.05	Ability to manually operate and/or monitor in the control room: Minimum flow valves	3.2	3
206000 HPCI					X							K4.18	Knowledge of HIGH PRESSURE COOLANT INJECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Pump minimum flow: BWR-2,3,4	3.2	4
217000 RCIC			X									K2.02	Knowledge of electrical power supplies to the following: RCIC Initiation logic	2.8	5
209001 LPCS		X										K1.09	Knowledge of the physical connections and/or cause- effect relationships between LOW PRESSURE CORE SPRAY SYSTEM and the following: Nuclear boiler instrumentation	3.2	6
2002002 Recirc Flow Control											X	A4.09	Ability to manually operate and/or monitor in the control room: Core Flow	3.2	7

Brunswick NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
211000 SLC									X			A2.04	Ability to (a) predict the impacts of the following on the STANDBY LIQUID CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Inadequate system flow	3.1	8
212000 RPS							X					K6.05	Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR PROTECTION SYSTEM : RPS Sensor inputs	3.5	9
212000 RPS									X			A2.09	Ability to (a) predict the impacts of the following on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High containment /Drywell pressure	4.1	10
215003 IRM							X					K6.05	Knowledge of the effect that a loss or malfunction of the following will have on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM : Trip Units	3.1	11
215004 Source Range Monitor						X						K5.01	Knowledge of the operational implications of the following concepts as they apply to SOURCE RANGE MONITOR (SRM) SYSTEM: Detector operation	2.6	12
215005 APRM / LPRM	X											2.1.20	Conduct of operations: Ability to execute procedure steps	4.3	13
217000 RCIC	X											2.1.33	Conduct of Operations: Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	14
218000 ADS					X							K4.02	Knowledge of AUTOMATIC DEPRESSURIZATION SYSTEM design feature(s) and/or interlocks which provide for the following: Allows manual initiation of ADS logic	3.8	15
218000 ADS	X											2.4.49	Emergency Procedures / Plan Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	16
223002 PCIS/Nuclear Steam Supply Shutoff					X							K4.05	Knowledge of PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF design feature(s) and/or interlocks which provide for the following: Single failures will not impair the function ability of the system	2.9	17

Brunswick NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
239002 SRVs		X										K1.07	Knowledge of the physical connections and/or cause- effect relationships between RELIEF/SAFETY VALVES and the following: Suppression pool	3.6	18
259002 Reactor Water Level Control					X							K4.10	Knowledge of REACTOR WATER LEVEL CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following: three element control	3.4	19
261000 SGTS		X										K1.09	Knowledge of the physical connections and/or cause- effect relationships between SGTS and the following: PCIS	3.2	20
262001 AC Electrical Distribution										X		A3.03	Ability to monitor automatic operations of the A.C. ELECTRICAL DISTRIBUTION including: Load shedding	3.4	21
262002 UPS (AC/DC)					X							K4.01	Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and/or interlocks which provide for the following: Transfer from preferred power to alternate power supplies	3.1	22
263000 DC Electrical Distribution			X									K2.01	Knowledge of electrical power supplies to the following: Major D.C. loads	3.1	23
264000 EDGs		X										K1.07	Knowledge of the physical connections and/or cause- effect relationships between EMERGENCY GENERATORS (DIESEL/JET) and the following: Emergency core cooling systems	3.9	24
300000 Instrument Air				X								K3.02	Knowledge of the effect that a loss or malfunction of the Instrument Air System will have on the following: Systems having pneumatic valves or controls.	3.3	25
400000 Component Cooling Water										X		A3.01	Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3.0	26
K/A Category Point Totals:	3/3	4	3	1	5	1	2	0	2/2	3	2	Group Point Total:			26/5

Brunswick NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 2

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
206000 HPCI	X											2.4.7	Knowledge of event based EOP mitigation strategies	3.8	91
290001 Secondary CTMT									X			A2.03	Ability to (a) predict the impacts of the following on the SECONDARY CONTAINMENT ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High area radiation	3.6	92
226001 RHR/LPCI Containment Spray Mode	X											2.1.9	Conduct of Operations: Ability to apply tech specs for a system	4.0	93
201002 RMCS											X	A4.02	Ability to manually operate and/or monitor in the control room: Emergency in/notch override switch	3.5	27
201003 Control Rod and Drive Mechanism						X						K5.01	Knowledge of the operational implications of the following concepts as they apply to CONTROL ROD DRIVE AND MECHANISM: Hydraulics	2.6	28
201006 RWM							X					K6.01	Knowledge of the effect that a loss or malfunction of the following will have on the ROD WORTH MINIMIZER SYSTEM (RWM) (PLANT SPECIFIC) : RWM power supply: P-Spec(Not-BWR6)	2.8	29
202001 Recirculation				X								K3.06	Knowledge of the effect that a loss or malfunction of the RECIRCULATION SYSTEM will have on following: Low pressure coolant injection logic: Plant-Specific	3.7	30
202002 Recirculation Flow Control					X							K4.02	Knowledge of RECIRCULATION FLOW CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following: Recirculation pump speed control: Plant-Specific	3.0	31
204000 RWCU						X						K5.05	Knowledge of the physical connections and/or cause- effect relationships between REACTOR WATER CLEANUP and the following: Flow Controllers	2.6	32
241000 Reactor/Turbine Pressure Regulator								X				A1.14	Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls including: Pressure setpoint/pressure demand	3.4	33
202001 Recirculation								X				A1.09	Ability to predict and/or monitor changes in parameters associated with operating the RECIRCULATION SYSTEM controls including: Recirc Pump Seal Pressures	3.3	34

Brunswick NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 2

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
268000 Radwaste											X	A4.01	Ability to manually operate and/or monitor in the control room: Sump integrators	3.4	35
286000 Fire Protection					X							K4.01	Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Adequate supply of water for the fire protection.	3.4	36
290001 Secondary CTMT										X		A3.02	Ability to monitor automatic operations of the SECONDARY CONTAINMENT including: Normal building differential pressure: Plant-Specific	3.5	37
214000 Rod Position Information System		X										K1.05	Knowledge of the physical connections and/or cause- effect relationships between ROD POSITION INFORMATION SYSTEM and the following: Full core display	3.3	38
K/A Category Point Totals:	0/2	2	0	1	2	1	1	2	0/1	1	2	Group Point Total:			12/3

Facility:		Brunswick NRC		Date of Exam:		3/10/2007	
Category	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
1. Conduct of Operations	2.1.12	Ability to apply technical specifications for a system.			4.0	94	
	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.			3.1	95	
	2.1.32	Ability to explain and apply all system limits and precautions.	3.4	66			
	2.1.1	Knowledge of conduct of operations requirements	3.7	67			
		Subtotal			2	2	
2. Equipment Control	2.2.7	Knowledge of the process for conducting tests or experiments not described in the safety analysis report.			3.2	96	
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.			3.7	97	
	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.	2.8	68			
	2.2.3	(multi-unit) Knowledge of the design, procedural, and operational differences between units.	3.1	69			
		Subtotal			2	2	
3. Radiation Control	2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).			2.9	98	
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.			3.1	99	
	2.3.2	Knowledge of the facility ALARA program	2.6	70			
	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements	2.6	71			
		Subtotal			2	2	
4. Emergency Procedures / Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.			4.3	100	
	2.4.27	Knowledge of fire in the plant procedure.	3.0	72			

	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including:1 Reactivity control 2. Core cooling and heat removal 3. Reactor coolant system integrity 4. Containment conditions 5. Radioactivity release control.	3.7	73		
	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	2.8	74		
	2.4.15	Knowledge of communications procedures associated with EOP implementation	3.0	75		
	Subtotal			4		1
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1 / 1	295027 EA2.02	(Q.80) 295028 EA2.01 randomly reselected. Mark III Containment only, does not apply to Brunswick.
1 / 1	295005 AK2.09	(Q.#42) AK2.01 randomly reselected. Initial selection does not apply to Brunswick (BWR 2 only)
1 / 1	295025 2.1.14	(Q.#50) 2.1.23 randomly reselected. Operational valid, discriminating question could not be written for the original topic selection.
1 / 1	295027 EK3.01	(Q.# 52) 295028 EK3.01 randomly reselected. Mark III Containment only, does not apply to Brunswick.
1 / 2	295008 AA2.03	(Q.#83) AA2.02 randomly reselected. A discriminating question at the SRO level could not be written
1 / 2	295022 AA1.04	(Q.#62) AA1.01 randomly reselected. Initial selection does not apply to Brunswick
2 / 1	215004 2.4.49	(Q.89) 2.4.11 randomly reselected. A discriminating question at the SRO level could not be written for original topic.
2 / 1	207000 K2.01	(Q.#5) 217000 K2.02 randomly reselected does not have an Isolation Condenser (original selection).
2 / 1	261000 2.1.14	(Q.#20) K1.09 randomly reselected. An operational valid question could not be written for original selection
2 / 1	300000 K2.01	(Q.#25) K3.02 randomly reselected. A discriminating question could not be written for original topic selection.
2 / 2	204000 K3.01	(Q.#32) K5.05 randomly selected. A discriminating question could not be written for original topic selection.
2 / 1	215003 K6.02	(Q.#11) K6.05 randomly selected. Insufficient documented technical information existed for original topic selection.
2 / 1	201003 A1.02	(Q.#28) K5.01 randomly selected. Initial selection was on previous NRC exam.
2 / 2	256000 A1.09	(Q.#34) 202001 A1.09 randomly selected. A discriminating question could not be written for original topic selection
2 / 2	286000 K2.02	(Q.#36) K4.01 randomly selected. Original selection was at a low level of importance and was considered minutia.
2 / 2	290002 K1.05	(Q.#38) 214000 K1.05 randomly selected. Original selection was at a low level of importance and was considered minutia.
1 / 1	295025 2.1.27	(Q.#79) 2.4.6 randomly reselected. The topic originally selected was not discriminating at the SRO level
1 / 1	295038 EK1.01	(Q.#57) EK1.02 randomly selected by the NRC. A discriminating question at the RO level could not be written for the original selection
2 / 1	215004 2.4.11	(Q.#89) 205000 randomly selected by the NRC. A discriminating question at the SRO level could not be written for the original selection.
1 / 2	295008 AA2.02	(Q.#83) AA2.01 randomly selected by the NRC. A discriminating question at the SRO level could not be written for the original selection

Facility:	BRUNSWICK	Scenario No.:	1	Op Test No.:	2007 NRC
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)
Initial Conditions: The plant is operating at 100% power, End of Cycle. No equipment is out of service					
Turnover: Swap RB Supply & Exhaust Fans from 2C to 2D for maintenance work. Maintenance personnel are standing by.					
Critical Task: See Scenario Summary					
Event No.	Malfunction No.	Event Type*	Event Description		
1	N/A	N-SRO N-BOP	Swap RB Supply and Exhaust Fans		
2	K4522A OFF	C-SRO C-BOP	2C RBCCW sheared shaft, 2B fails to auto start (AOP)		
3	RC026F	C-SRO C-RO	Runback of 2A Recirc Pump to Limiter #2. (TS) (AOP)		
4	N/A	R-SRO R-RO	Increase power following the runback.		
5	NB014F	TS-SRO	Instrument Penetration X49A Line Break – Remote Shutdown Instrumentation is lost (TS)		
6	CN019F CN011F	C-SRO I-BOP	AOG fails to isolate on High H2 signal		
7	EE009F DG026F	M-ALL	Loss of Offsite Power, DG3 Differential Fault, Reactor Scram (AOPs, EOPs)		
8	ES028F	C-SRO C-RO	HPCI injection valve fails to auto open		
9	NB006F	M-ALL	Steam Leak in Drywell, Emergency Depressurization (EOPs) RHR Loop "B", drywell spray valve fails closed		
10	K1J36A	C-SRO C-BOP			
11	NB025F	I-ALL	Level instrument failure, Reference leg flashing, Reactor Flooding required		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

- NOTES:**
- 1) S = Satisfactory; U - Unsatisfactory; N/O = Not Observed
All Unsatisfactory ratings require comments; a comment sheet is attached.
 - 2) * = Critical Task/Step

SCENARIO DESCRIPTION

Unit 2 is operating at maximum power, End Of Cycle.

A swap of RB Supply & Exhaust Fans will be required to support maintenance activities. Following the swap of RB fans, RBCCW Pump 2C coupling fails and 2B RBCCW Pump will fail to Auto-Start on pressure, but will be able to be manually started.

After restart of the 2B RBCCW Pump, Reactor Recirculation Pump 2A will runback to Limiter #2. After addressing the Technical Specifications and discussions with I&C, the 2A Recirculation Pump Limiter #2 signal will be reset and power returned to the pre-event level.

A Reactor Instrument Penetration line break occurs (X49A) and the line is isolated affecting instrument N026B for Remote Shutdown Panel Level Indication R604BX. Technical Specifications must be addressed. After TS are addressed, AOG will receive a high-high H2 signal due to a failed hydrogen detector and will fail to isolate requiring manual isolation by the BOP.

Off-Site Power will be lost. DG4 will auto start and tie to E4. DG3 will auto start and briefly tie to E3, but will then trip on overcurrent and E3 will be unavailable. E1 and E3 cannot be cross-tied due to the overcurrent lockout. If the crew attempts to crosstie E7 and E8 the cross-tie breaker at E8 will fail. The loss of E3/E7 results in loss of level transmitters N026A and N027A. HPCI and RCIC are available for RPV level control. SRVs are available for pressure control. The HPCI injection valve will fail to auto open but can be manually opened. Additionally, RBCCW cooling will be shifted to conventional service water. 120V Panels 2-AB, 2-AB-RX and 32AB will be transferred to alternate.

A steam leak will occur in the drywell. Drywell coolers will trip and the RHR Loop "B" drywell spray valve (E11-F016B) cannot be opened causing drywell temperature to rise above 300°F requiring emergency depressurization (**CRITICAL TASK**). Following emergency depressurization reactor pressure and drywell reference leg temperature will be in the unsafe region of the RPV saturation limit

The only available level instruments (N004A, N004C, N036 and N027B) will begin to exhibit indications of reference leg flashing. With no valid indication of RPV level, the crew will enter the Reactor Flooding Procedure.

The crew will increase available injection to maximum until at least 5 SRVs are open and Reactor pressure is at least 50 psig above suppression chamber pressure (Minimum Reactor Flooding Pressure) (**CRITICAL TASK**). Once these conditions are established the crew will throttle flow to maintain at least the required 50 psig differential but as low as possible.

When RPV flooding conditions have been established, the scenario may be terminated.

- NOTES:**
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Facility:	BRUNSWICK	Scenario No.:	2	Op Test No.:	2007 NRC
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)
Initial Conditions:					
The plant is operating at maximum power, Middle of Cycle.					
Turnover:					
Several LPRMs have failed and have been bypassed.					
CRD Pump 2B is under clearance to replace oil in the speed changer and will be out of service for four hours.					
CSW Pump 2C was under clearance and is ready to be placed in service. Once it has been placed in service. CSW pump 2A is to be removed from service.					
No other equipment is out of service.					
Reduce power to 90% for upcoming turbine valve testing.					
Critical Task: See Scenario Summary					
Event No.	Malfunction No.	Event Type*	Event Description		
1	N/A	R-SRO R-RO	Power reduction with recirc flow from 100% to 90%		
2	NI048M, 28-13D	I-SRO I-RO	An LPRM fails low and must be bypassed this will make APRM # 1 inoperative for only one LPRM operable for Level B.		
3	N/A	N-SRO N-BOP	Swap CSW pumps		
4	K4B39A Auto Off CW027F	C-SRO C-BOP	After CSW Pump 2A is removed from service CSW pump 2C trips on overcurrent and CSW Pump 2A fails to auto start. (AOP)		
5	ES015F	TS-SRO	HPCI logic power failure (TS)		
6	CW015F	C-ALL	CW intake screens progressively foul resulting in high screen d/ps and eventual total loss of CW, lowering vacuum (AOP)		

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7	RP011F SL_IASLRB BKR OFF	M-ALL C-RO	Group 1 isolation, ATWS, One SLC pump fails (EOPs)
8	RW016F	C-SRO C-RO	RWCU outboard isolation valve fails to automatically isolate on SLC initiation.
9	RI_IARIUNCP	C-SRO C-BOP	Failure of RCIC turbine coupling
10	K2213A Isolate	C-SRO	Failure of SDV vent and drain valves to OPEN following the scram reset.
11	K1507A Open Off	C-SRO C-BOP	One ADS SRV fails to OPEN during Emergency depressurization (EOPs), Restoration of vessel level
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

- NOTES:**
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 - 2) * = Critical Task/Step

SCENARIO DESCRIPTION

BRUNSWICK 2007 NRC Scenario #2

The plant is operating at 100% power, Middle of Cycle with 2C CWIP and CRD Pump 2B under clearance. 2C CSW Pump has just been placed in standby following maintenance and needs to be placed in service. A downpower is required for upcoming turbine valve testing. While power is being reduced an LPRM will fail downscale causing a Technical Specification tracking LCO and inoperability of the #1 APRM on LPRM level inputs for the B level.

The operators will start CSW pump 2C following maintenance work. Following the pump start, CSW Pump 2A will be removed from service and placed in standby. The 2C CSW pump will then trip on overcurrent and the 2A CSW pump will fail to auto start (it will start manually). The crew will respond per AOP-19.0. Once the CSW pump issue is addressed, a HPCI logic power failure will occur requiring a technical specification entry.

The Circulating Water Intake Pumps (CWIPs) traveling screens will progressively plug with river silt resulting in CWIP pump trips. Condenser vacuum will initially slowly lower. The crew will enter AOP-37.1, Intake Structure Blockage. The RO will lower reactor power and the BOP operator will attempt to recover CWIPs. Eventually all CWIPs will trip and condenser vacuum will be lost causing a Group 1 isolation. If the Reactor had not been scrammed, a scram will occur.

Most control rods will fail to insert on the scram. The crew will respond per 2-EOP-01- LPC. When SLC is initiated, SLC pump 2B will trip on overcurrent. Additionally RWCU will fail to automatically isolate. When RPS is reset, the SDV vent and drain valves will fail to open. Initiating SLC and/or inserting control rods per LEP-02 is a **Critical Task**

RPV level will be deliberately lowered to suppress power. When RCIC initiates on LL2, the RCIC Turbine coupling will break.

Without HPCI or RCIC, RPV level will drop below LL4 requiring Emergency Depressurization (**Critical Task**). The crew must terminate and prevent injection prior to ED per 2EOP-01-LPC (**Critical Task**). When ADS valves are opened ADS Valve C fails to open. Low pressure ECCS must be overridden off to prevent uncontrolled injection during depressurization. When pressure drops below MARFP, injection may be recommenced to restore RPV level above LL4 (**Critical Task**). Condensate should be used for injection due to inability to throttle RHR flow for 5 minutes.

When the rods are all inserted and/or hot shutdown boron weight has been injected and level is being restored to 170-200", the scenario may be terminated.

- NOTES:**
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All Unsatisfactory ratings require comments; a comment sheet is attached.
 - 2) * = Critical Task/Step

Facility:	BRUNSWICK	Scenario No.:	3	Op Test No.:	2007 NRC
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)
Initial Conditions:					
<p>The plant is operating at 94% power, End Of Cycle.</p> <p>RHR SW Pump 2D is under clearance for motor replacement and will remain out of service for two days.</p> <p>TBCCW Pump 2B is under clearance to investigate a high vibration. TBCCW Pump 2C has been placed in service on Unit 2.</p> <p>No other equipment is out of service.</p>					
Turnover: Swap Service Water Pumps for maintenance work on the operating pump. Raise power to 100%					
Critical Task: See Scenario Summary					
Event No.	Malf. No.	Event Type*	Event Description		
1	N/A	N-SRO N-BOP	Swap NSW pumps		
2	N/A	R-SRO R-RO	Power increase to 100% for rod pattern adjustment		
3	MRC021F	C-SRO C-RO	Recirc Pump "A" scoop tube lockup		
4	ZUA2162 ON	TS-SRO	EDG low starting air pressure (TS)		
5	CW019F (A) K4821A-Auto Off	C-SRO C-BOP	NSW pump trip(AOP) and standby pump fails to auto start		
6	ES27F	C-SRO C-RO	RCIC Mechanical Overspeed Trip		
7	K4403A Open 30 sec	C-ALL	Partial Loss of FW heating, Power reduction required (AOPs)		
8	NB005F RP005F K2503A-AS IS	M-ALL	Fuel Failure, Hi MSL Rads, MSIVs closed, Manual & Auto Scram Fail, (EOP)(AOP) Initiates ARI (CT)		
9	ES004F	C-SRO C-BOP	SRV F sticks open		

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10	K1230A-AS IS RSIARHBYPB- Bypass	C-SRO C-BOP	RHR Loop A SW HX outlet valve fails, F068B valve (RHR HX Service Water Outlet) will fails to auto close.
11	CW071F (B) CW013F	C-SRO C-BOP	RHR SW 2B pump trip, RHR leak into service water. (CT)
12	CA020F	M-ALL	SRV F tailpipe break, ED required (CT)
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

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- 2) * = Critical Task/Step

SCENARIO DESCRIPTION

BRUNSWICK 2007 NRC Scenario #3

The plant is operating at 87% power, End Of Cycle with RHR SW Pump 2D and TBCCW Pump 2B under clearance. A swap of NSW pumps is required for upcoming maintenance on the operating pump. After swapping NSW pumps, reactor power will be raised to 100%.

While power is being raised a scoop tube lockup will occur on the "A" Recirc MG Set. I&C will report a circuit breaker caused the problem and the operator can reset the scoop tube. Once the scoop tube has been reset and recirc flows are matched, the #3 EDG will have a low starting air pressure requiring a technical specification determination (TS). (The EDG #3 must be declared inoperable).

Following the TS determination for the EDG (3.8.1.D), the NSW pump previously started will trip, requiring a restart of the NSW pump originally removed from service (TS 3.7.2.B). Once the NSW pump is restarted, a RCIC overspeed trip will occur due to a field operator accidentally unlatching the mechanism (T.S. 3.5.3.A). The RO will respond and re-latch the trip mechanism.

Feedwater valve FW-V120 will partially open resulting in a loss of feedwater heating and rising reactor power. The crew will respond per AOP-03.0 and reduce reactor power. The FW-V120 valve can be manually closed by the operators.

Fuel failure will occur that causes SJAE readings to rise and MSL Rad Hi to alarm. The crew will respond by entering AOP-05.0 and 0EOP-04-RRCP. Power will be reduced to clear the MSL Rad Hi alarm. The fuel failure will get worse resulting in MSL Hi-Hi alarm along with rising Main Stack readings and alarms. Per the guidance of 0EOP-04-RRCP, the crew will insert a manual reactor scram and close the Group 1 Isolation Valves ***** (Critical task to Close the MSIVs and Drains)**. The manual scram switch for channel B will fail. The reactor can be scrammed by Mode switch or ARI initiation **(Critical Task)**.

When the MSIVs are closed SRVs will be required for pressure control. When SRV F is opened, it will stick open. Suppression pool temperature will rise requiring initiation of suppression pool cooling per 0EOP-02-PCCP. If RHR Loop "A" is started for suppression pool cooling, the E11-F068A valve (RHR HX Service Water Outlet) will fail to open and RHR Loop "A" will be unavailable for suppression pool cooling.

When RHR Loop B is started for suppression pool cooling, the RHR Heat Exchanger will develop a tube leak. The tube leak will initially result in leakage of service water into the RHR system and RHR high conductivity alarm. RHR SW Booster Pump 2B will then trip (RHR SW 2D is under clearance) and E11-F068B will fail to auto close. Without an RHR Service Water pump in operation, RHR system water will now leak into service water.

Service Water high radiation will alarm. The crew will respond to the service water release per EOP-04-RRCP by closing E11-F068B, shutting down RHR Loop B and isolating the heat exchanger **(Critical Task)**.

The F SRV tailpipe will fail and Emergency Depressurization will be required per 0EOP-02 PCCP when the safe region of Pressure Suppression Pressure (PSP) can not be maintained **(Critical Task)**.

When the reactor is depressurized by the Emergency Depressurization, the scenario may be terminated.

- NOTES:**
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All Unsatisfactory ratings require comments; a comment sheet is attached.
 - 2) * = Critical Task/Step

Facility:	BRUNSWICK	Scenario No.:	4	Op Test No.:	2007 NRC																												
Examiners:	_____	Operators:	_____	_____	_____																												
	_____		_____	_____	_____																												
	_____		_____	_____	_____																												
Initial Conditions:	<p>A plant startup is in progress. Reactor Power is approximately 4%</p> <p>GP-2 has been completed with the exception of steps 5.3.55, 5.3.60, 5.3.61, and 5.3.62</p> <p>The "B" SJAE is in Full Load; the "A" SJAE is shut down</p> <p>Reactor Pressure is being held at 800 psig to support EHC electrical testing.</p> <p>Power increase by control rod withdrawal has been authorized to provide additional bypass valve opening.</p> <p>The Nuclear Engineer has been contacted and continuous rod withdrawal may be used.</p>																																
Turnover:	<p>Continue plant startup IAW GP-2 at step 5.3.55</p> <p>Place the SJAEs in half load. Currently in 2OP-30.</p> <p>Continue in GP-10 at Sequence A2X, step 24, Item 251 and raise power, using control rods, to achieve one bypass valve open. Do not exceed 8% power.</p>																																
Critical Task:	See Scenario Summary																																
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Event No.</th> <th style="width:15%;">Malf. No.</th> <th style="width:15%;">Event Type*</th> <th style="width:60%;">Event Description</th> </tr> </thead> <tbody> <tr> <td style="text-align:center;">1</td> <td style="text-align:center;">N/A</td> <td style="text-align:center;">N-SRO N-BOP</td> <td>Place SJAEs in half load.</td> </tr> <tr> <td style="text-align:center;">2</td> <td style="text-align:center;">N/A</td> <td style="text-align:center;">R-SRO R-RO</td> <td>Increase reactor power</td> </tr> <tr> <td style="text-align:center;">3</td> <td style="text-align:center;">N1019F</td> <td style="text-align:center;">I-SRO I-RO</td> <td>IRM "C" Fails "Downscale"</td> </tr> <tr> <td style="text-align:center;">4</td> <td style="text-align:center;">Overrides</td> <td style="text-align:center;">TS-SRO</td> <td>HCU Alarm (TS)</td> </tr> <tr> <td style="text-align:center;">5</td> <td></td> <td style="text-align:center;">C-SRO C-BOP</td> <td>"A" SPE Fan Trips</td> </tr> <tr> <td style="text-align:center;">6</td> <td style="text-align:center;">NI024F, Overrides</td> <td style="text-align:center;">I/C-SRO I-RO C-BOP</td> <td>Seismic Event, spurious start of EDG, IRM upscale (TS) (AOP)</td> </tr> </tbody> </table>						Event No.	Malf. No.	Event Type*	Event Description	1	N/A	N-SRO N-BOP	Place SJAEs in half load.	2	N/A	R-SRO R-RO	Increase reactor power	3	N1019F	I-SRO I-RO	IRM "C" Fails "Downscale"	4	Overrides	TS-SRO	HCU Alarm (TS)	5		C-SRO C-BOP	"A" SPE Fan Trips	6	NI024F, Overrides	I/C-SRO I-RO C-BOP	Seismic Event, spurious start of EDG, IRM upscale (TS) (AOP)
Event No.	Malf. No.	Event Type*	Event Description																														
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7	NI018F RP011F RW013F RW016F EE030M Overrides	M-ALL	Seismic aftershock, ATWS, RWCU Unisolable Leak (EOP) (AOP)
8	CF035F	C-SRO C-BOP	FW injection Valve FW-V120 or Startup Level Control Valve fails closed (dependent on which method of feed is chosen by the operator)
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

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SCENARIO DESCRIPTION

BRUNSWICK 2007 NRC Scenario #4

The plant is at approximately 4% power and a startup is in progress IAW GP-2. The SJAEs must be placed in half load.

As control rods are withdrawn, IRM "C" will fail. The operator must recognize that the IRM "C" is failed. When diagnosed, the SRO will consult TS (3.3.1-RPS) and declare IRM "C" inoperable and direct the RO to bypass IRM "C".

Once the startup continues, Scram Accumulator 34-19 will alarm on low pressure. The crew will dispatch an AO to investigate/charge the HCU. The crew will reference Tech Spec 3.1.5.C.2. and declare the control rod accumulator inoperable if it cannot be recharged within 1 hour.

After TS are addressed for the accumulator the "B" Steam Packing Exhauster will trip requiring starting of the "A" Steam Packing Exhauster.

A seismic event will occur. This will cause the spurious start of the EDG 3 and a high alarm trip of IRM F. A half scram will not occur and this must be diagnosed by the crew. AOP-13 will be entered and the EDG can be secured. IAW Tech Specs (3.3.1), a half scram must be inserted due to the IRM high alarm trip and it will be successful. I&C will also be notified to pull fuses IAW OI-18.

A seismic aftershock will then occur causing IRM A to trip on high alarm but RPS will fail and a manual scram must be inserted. Numerous control rods will fail to insert and 2-EOP-1-LPC must be entered for the ATWS. Control Rods must be inserted manually and/or SLC injected (**Critical Task**) to shut down the reactor. Additionally, a leak will develop in the RWCU system, RWCU will fail to isolate on the SLC initiation and power will be lost to MCC 2XC.

Attempts to isolate the RWCU leak will be ongoing but will fail. The crew will enter 2EOP-03-SCCP as temperatures and sump levels begin to rise in the Reactor Building. When room flood levels in two areas of the Rx Building exceed max safe levels, Emergency Depressurization will be required (**Critical Task**). The crew must terminate and prevent injection prior to ED per 2EOP-01-LPC (**Critical Task**). **NOTE: In the event the crew inserts control rods and enters 2EOP-01-RVCP prior to reflood, Terminate and Prevent would not be required and would not be a critical task.**

After the ED, a failure will occur on either the RFPT S/U level control valve or the 2FW-V120 (High Pressure Feedwater Heaters bypass valve) to restore and control vessel level following emergency depressurization. The failure will occur on whatever method is first used by the operator to feed the vessel.

The scenario can be terminated once emergency depressurization occurs and reactor water level has recovered and is stable in the normal band

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Final Submittal
(Blue Paper)

FINAL OUTLINES

ES-301

Administrative Topics Outline

Form ES-301-1

Facility: Brunswick		Date of Examination: JULY 2007
Examination Level (circle one): RO / SRO		Operating Test Number: NRC 2007
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D	Determine Primary Containment Water Level and Evaluate PCPL-A.
Conduct of Operations	N	Perform a portion of Control Operator Daily Surveillance Report 2OI-03.2 and identify 4 OOS readings and appropriate TS entries.
Equipment Control	M	Generate a Clearance for maintenance activities on the 2C TBCCW Pump.
Radiation Control	D	Determine Off-Site Release Per PEP-03.4.7 and Complete Notification Form.
Emergency Plan	N	Evaluate plant conditions (includes security event) and classify the event. Make PAR determination as required.

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

*Type Codes & Criteria:

- (C)ontrol room
- (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
- (N)ew or (M)odified from bank (> 1)²
- (P)revious 2 exams (≤ 1 ; randomly selected)²
- (S)imulator

**2007 NRC Examination
Summary Description of Admin Tasks**

- A.1.a The candidate will determine Primary Containment Water Level and Evaluate PCPL-A This is a bank JPM.
- A.1.b The candidate will review a portion of the Control Operator Daily Surveillance Report 2OI-03.2 and identify 4 OOS readings and appropriate TS entries. This is a new JPM.
- A.2 The candidate will generate a clearance for maintenance activities on the 2C TBCCW. This is a modified JPM requiring sequence and dual unit power supply tagging requirements.
- A.3 The candidate will determine the offsite release rate and fill out appropriate forms. This is a bank JPM.
- A.4 The candidate will evaluate degraded plant conditions which include a security event and make an event classification and PAR as required. This is a new JPM.

Facility: Brunswick		Date of Examination: 2007
Examination Level (circle one): RO / SRO		Operating Test Number: NRC 2007
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D	Hand Calculation Of APRM GAFs Per PT-01.8C
Conduct of Operations	N	Perform a portion of Control Operator Daily Surveillance Report 2OI-03.2 and identify 4 OOS readings.
Equipment Control	M	Generate a Clearance for maintenance activities on the 2C TBCCW pump.
Radiation Control	N	Determine Stay Time and Radiological requirements for performing work in a High Radiation Area.
Emergency Plan	N/A	

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

*Type Codes & Criteria:

- (C)ontrol room
- (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
- (N)ew or (M)odified from bank (> 1)²
- (P)revious 2 exams (≤ 1 ; randomly selected)²
- (S)imulator

**2007 NRC Examination
Summary Description of Admin Tasks**

- A.1.a This is a bank JPM. The candidate will manually calculate APRM GAFs.
- A.1.b This is a new JPM. The candidate will perform a portion of Control Operator Daily Surveillance Report 2OI-03.2 and identify 4 OOS readings.
- A.2 The candidate will generate a clearance for maintenance activities on the 2C TBCCW. This is a modified JPM requiring sequence and dual unit power supply tagging requirements.
- A.3 This is a new JPM. The candidate will be required to determine stay time and radiological requirements for performing work in a High Radiation Area