Facility BRUNSWICK Date of Exam: 2012, DECEMBER

Tier	Group	RO K/A Category Points												SRO-Only Points			
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	4	3	3	N/A			3	4	N/A		3	20	4	3	7
	2	2	1	1				1	1			1	7	2	1	3
	Tier Totals	6	4	4				4	5			4	27	6	4	10
2. Plant Systems	1	2	3	2	3	2	2	2	3	2	2	3	26	3	2	5
	2	1	2	1	1	1	1	1	1	1	1	1	12	0 2	1	3
	Tier Totals	3	5	3	4	3	3	3	4	3	3	4	38	5	3	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			3			2			2			1	2	2	2	

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. *The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note # 1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401 BWR Examination Outline Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4						R	(R) G 2.2.22		
295003 Partial or Complete Loss of AC / 6					R		(R) AA2.01		
295004 Partial or Total Loss of DC Pwr / 6				R		S	(R) A A1.03 , (S) G 2.1.23		
295005 Main Turbine Generator Trip / 3		R					(R) A K2.04		
295006 SCRAM / 1	R					S	(R) AK1.02 , (S) G 2.1.25		
295016 Control Room Abandonment / 7			R				(R) AK3.01		
295018 Partial or Total Loss of CCW / 8				R			(R) AA1.01		
295019 Partial or Total Loss of Inst. Air / 8					S	R	(R) G 2.1.32, (S) AA 2.02		
295021 Loss of Shutdown Cooling / 4					R		(R) AA2.04		
295023 Refueling Acc / 8			R				(R) AK3.02		
295024 High Drywell Pressure / 5			R				(R) EK3.04		
295025 High Reactor Pressure / 3				R	S		(R) EA1.05, (S) EA2.03		
295026 Suppression Pool High Water Temp. / 5		R					(R) EK2.01		
295027 High Containment Temperature / 5									
295028 High Drywell Temperature / 5	R						(R) EK1.02		
295030 Low Suppression Pool Wtr Lvl / 5					R		(R) EA2.02		
295031 Reactor Low Water Level / 2	R						(R) EK1.02		
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	R				S		(R) EK1.01 , (S) EA2.05		
295038 High Off-site Release Rate / 9		R					(R) EK2.06		
600000 Plant Fire On Site / 8					R/S		(R) AA2.10 , (S) AA2.15		
700000 Generator Voltage and Electric Grid Disturbances / 6						R/S	(R) G2.4.30, (S) G2.2.42		
K/A Category Totals: RO	4	3	3	3	4	3	Group Point Total:		20/7
SRO					4	3			

ES-401, REV 9 (RO) **T1G1 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295003AA2.01	Partial or Complete Loss of AC / 6	3.4	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Cause of partial or complete loss of A.C. power.....
295004AA1.03	Partial or Total Loss of DC Pwr / 6	3.4	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	A.C. electrical distribution.....
295005AK2.04	Main Turbine Generator Trip / 3	3.3	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Main generator protection.....
295006AK1.02	SCRAM / 1	3.4	3.7	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Shutdown margin.....
295016AK3.01	Control Room Abandonment / 7	4.1	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Reactor SCRAM.....
295018AA1.01	Partial or Total Loss of CCW / 8	3.3	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Backup systems.....
295019G2.1.32	Partial or Total Loss of Inst. Air / 8	3.8	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to explain and apply all system limits and precautions.
295021AA2.04	Loss of Shutdown Cooling / 4	3.6	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Reactor water temperature .....
295023AK3.02	Refueling Acc ~~Cooling Mode~~ / 8	3.4	3.8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Interlocks associated with fuel handling equipment....
295024EK3.04	High Drywell Pressure / 5	3.7	4.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Emergency depressurization.....
295025EA1.05	High Reactor Pressure / 3	3.7	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	RCIC: Plant-Specific.....

ES-401, REV 9 (RO) **T1G1 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295026EK2.01	Suppression Pool High Water Temp. / 5	3.9	4.0	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Suppression pool cooling.....
295028EK1.02	High Drywell Temperature / 5	2.9	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Equipment environmental qualification.....
295030EA2.02	Low Suppression Pool Wtr Lvl / 5	3.9	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Suppression pool temperature.....
295031EK1.02	Reactor Low Water Level / 2	3.8	4.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation: Plant-Specific.....
295037EK1.01	SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	4.1	4.3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reactor pressure effects on reactor power.....
295038EK2.06	High Off-site Release Rate / 9	3.4	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Process liquid radiation monitoring system.....
600000AA2.10	Plant Fire On Site / 8	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Time limit of long-term-breathing air system for control room
700000G2.4.30	Generator Voltage and Electric Grid Distrurbancecs	2.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of events related to system operations/status that must be reported to internal orginizations or outside agencies.
295001G2.2.22	Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.

ES-401, REV 9 **SRO T1G1 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295004G2.1.23	Partial or Total Loss of DC Pwr / 6	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform specific system and integrated plant procedures during all modes of plant operation.
295006G2.1.25	SCRAM / 1	3.9	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to interpret reference materials such as graphs, monographs and tables which contain performance data.
295019AA2.02	Partial or Total Loss of Inst. Air / 8	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Status of safety-related instrument air system loads (see AK2.1 - AK2.19).....
295025EA2.03	High Reactor Pressure / 3	3.9	4.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Suppression pool temperature.....
295037EA2.05	SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	4.2	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Control rod position.....
600000AA2.15	Plant Fire On Site / 8	2.3	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Requirements for establishing a fire watch
700000G2.2.42	Generator Voltage and Electric Grid Distrurbancecs	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3						R	(R) G2.4.45		
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2									
295009 Low Reactor Water Level / 2					R		(R) AA2.02		
295010 High Drywell Pressure / 5	R					S	(R) AK1.03, (S) G2.1.20		
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5									
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9		R					(R) AK2.08		
295020 Inadvertent Cont. Isolation / 5 & 7									
295022 Loss of CRD Pumps / 1	R						(R) AK1.02		
295029 High Suppression Pool Wtr Lvl / 5				R			(R) EA1.04		
295032 High Secondary Containment Area Temperature / 5			R				(R) AK3.01		
295033 High Secondary Containment Area Radiation Levels / 9					S		(S) EA2.03		
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5					S		(S) EA2.01		
K/A Category Point Totals: RO	2	1	1	1	1	1	Group Point Total:		7/3
SRO					2	1			

ES-401, REV 9 (RO) **T1G2 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295002G2.4.45	Loss of Main Condenser Vac / 3	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.
295009AA2.02	Low Reactor Water Level / 2	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Steam flow/feed flow mismatch.....
295010AK1.03	High Drywell Pressure / 5	3.2	3.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Temperature increases.....
295017AK2.08	High Off-site Release Rate / 9	2.8	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	SPDS/ERIS/CRIDS/GDS.....
295022AK1.02	Loss of CRD Pumps / 1	3.6	3.7	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reactivity control.....
295029EA1.04	High Suppression Pool Wtr Lvl / 5	3.4	3.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	RCIC: Plant-Specific.....
295032EK3.01	High Secondary Containment Area Temperature / 5	3.5	3.8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Emergency/normal depressurization.....

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295010G2.1.20	High Drywell Pressure / 5	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
295033EA2.03	High Secondary Containment Area Radiation Levels / 9	3.7	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Cause of high area radiation.....
500000EA2.01	High CTMT Hydrogen Conc. / 5	3.1	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Hydrogen monitoring system availability

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-1		
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	#
203000 RHR/LPCI: Injection Mode		R										(R) K2.01		
205000 Shutdown Cooling							R	R				(R) A1.10, (R) A2.12		
206000 HPCI						R						(R) K6.10		
207000 Isolation (Emergency) Condenser (N/A)														
209001 LPCS				R							S	(R) K4.08, (S) G2.1.27		
209002 HPCS (N/A)														
211000 SLC					R							(R) K5.02		
212000 RPS										R		(R) A4.04		
215003 IRM				R				S				(R) K4.04, (S) A2.01		
215004 Source Range Monitor										R		(R) A4.03		
215005 APRM / LPRM									R			(R) A3.04		
217000 RCIC			R									(R) K3.01		
218000 ADS								S			R	(R) G2.4.20, (S) A2.05		
223002 PCIS/Nuclear Steam Supply Shutoff	R											(R) K1.07		
239002 SRVs			R								R	(R) G2.4.2, (R) K3.01		
259002 Reactor Water Level Control									R			(R) A3.10		
261000 SGTS	R			R				S				(R) K1.03, (R) K4.04, (S) A2.03		
262001 AC Electrical Distribution		R										(R) K2.01		
262002 UPS (AC/DC)								R				(R) A2.02		
263000 DC Electrical Distribution							R				S	(R) A1.01, (S) G2.4.45		
264000 EDGs					R			R				(R) A2.06, (R) K5.05		
300000 Instrument Air											R	(R) G2.2.39		
400000 Component Cooling Water		R				R						(R) K2.02, (R) K6.07		
K/A Category Point Totals: RO	2	3	2	3	2	2	2	3	2	2	3	Group Point Total:		26/5
SRO								3		2				

ES-401, REV 9 (RO) **T2G1 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
203000K2.01	RHR/LPCI: Injection Mode	3.5	3.5	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Pumps
205000A1.10	Shutdown Cooling	3.0	2.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Throttle valve position
205000A2.12	Shutdown Cooling	2.9	3.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Inadequate system flow
206000K6.10	HPCI	3.8	4	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	PCIS: BWR-2,3,4
209001K4.08	LPCS	3.8	4.0	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Automatic system initiation
211000K5.02	SLC	2.8	3.0	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Chugging (as it pertains to boron mixing)
212000A4.04	RPS	3.9	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Bypass SCRAM instrument volume high level SCRAM signal
215003K4.04	IRM	2.9	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Varying system sensitivity levels using range switches
215004A4.03	Source Range Monitor	2.9	2.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	CRT displays: Plant-Specific
215005A3.04	APRM / LPRM	3.2	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Annunciator and alarm signals
217000K3.01	RCIC	3.7	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Reactor water level

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
218000G2.4.20	ADS	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operational implications of EOP warnings, cautions and notes.
223002K1.07	PCIS/Nuclear Steam Supply Shutoff	3.4	3.6	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reactor core isolation cooling; Plant-Specific
239002G2.4.2	SRVs	4.5	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.
239002K3.01	SRVs	3.9	4.0	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Reactor pressure control
259002A3.10	Reactor Water Level Control	3.1	3.0	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	TDRFP lockup: TDRFP
261000K1.03	SGTS	2.9	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Suppression pool
261000K4.04	SGTS	2.7	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Radioactive particulate filtration
262001K2.01	AC Electrical Distribution	3.3	3.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Off-site sources of power
262002A2.02	UPS (AC/DC)	2.5	2.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Over voltage
263000A1.01	DC Electrical Distribution	2.5	2.8	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Battery charging/discharging rate
264000A2.06	EDGs	3.4	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Opening normal and/or alternate power to emergency bus

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
264000K5.05	EDGs	3.4	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Paralleling A.C. power sources
300000G2.2.39	Instrument Air	3.9	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of less than one hour technical specification action statements for systems.
400000K2.02	Component Cooling Water	2.9	2.9	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	CCW valves
400000K6.07	Component Cooling Water	2.7	2.8	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Breakers, relays, and disconnects

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
209001G2.1.27	LPCS	3.9	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system purpose and or function.
215003A2.01	IRM	2.8	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Power supply degraded
218000A2.05	ADS	3.4	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of A.C. or D.C. power to ADS valves
261000A2.03	SGTS	2.9	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	High train temperature
263000G2.4.45	DC Electrical Distribution	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)												Form ES-401-1	
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	#
201001 CRD Hydraulic											R	(R) G2.4.50		
201002 RMCS														
201003 Control Rod and Drive Mechanism														
201004 RSCS														
201005 RCIS														
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control														
204000 RWCU														
214000 RPIS														
215001 Traversing In-core Probe							R					(R) A1.01		
215002 RBM								S				(S) A2.01		
216000 Nuclear Boiler Inst.														
219000 RHR/LPCI: Torus/Pool Cooling Mode										R		(R) A4.12		
223001 Primary CTMT and Aux.														
226001 RHR/LPCI: CTMT Spray Mode				R								(R) K4.01		
230000 RHR/LPCI: Torus/Pool Spray Mode			R									(R) K3.04		
233000 Fuel Pool Cooling/Cleanup														
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam		R										(R) K2.01		
239003 MSIV Leakage Control														
241000 Reactor/Turbine Pressure Regulator											S	(S) G2.4.9		
245000 Main Turbine Gen. / Aux.								R				(R) A2.09		
256000 Reactor Condensate						R						(R) K6.09		
259001 Reactor Feedwater														
268000 Radwaste														
271000 Offgas	R							S				(R) K1.11, (S) A2.04		
272000 Radiation Monitoring		R										(R) K2.03		
286000 Fire Protection														
288000 Plant Ventilation					R							(R) K5.01		
290001 Secondary CTMT									R			(R) A3.02		
290003 Control Room HVAC														
290002 Reactor Vessel Internals														
K/A Category Point Totals: RO	1	2	1	1	1	1	1	1	1	1	1	Group Point Total:		12/3
SRO								2			1			

ES-401, REV 9 (RO) **T2G2 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
201003G2.4.50	Control Rod and Drive Mechanism	4.2	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.
215001A1.01	Traversing In-core Probe	2.8	2.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Radiation levels: (Not-BWR1)
219000A4.12	RHR/LPCI: Torus/Pool Cooling Mode	4.1	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Suppression pool temperature
226001K4.01	RHR/LPCI: CTMT Spray Mode	2.6	2.8	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Testability of all operable components
230000K3.04	RHR/LPCI: Torus/Pool Spray Mode	3.7	3.8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Suppression chamber air temperature
239001K2.01	Main and Reheat Steam	3.2	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Main steam isolation valve solenoids
245000A2.09	Main Turbine Gen. / Aux.	2.5	2.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Turbine vibration
256000K6.09	Reactor Condensate	2.6	2.6	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Offgas system
271000K1.11	Offgas	3.1	3.6	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Station radioactive release rate
272000K2.03	Radiation Monitoring	2.5	2.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Stack gas radiation monitoring system
288000K5.01	Plant Ventilation	3.1	3.2	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Airborne contamination control

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
290001A3.02	Secondary CTMT	3.5	3.5	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Normal building differential pressure: Plant-Specific

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
215002A2.01	RBM	3.3	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Withdrawal of control rod in high power region of core: BWR-3,4,5
241000G2.4.9	Reactor/Turbine Pressure Regulator	3.8	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.
271000A2.04	Offgas	3.7	4.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Offgas system high radiation

Facility: BRUNSWICK Date of Exam: DECEMBER 2012

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.5	(R) G 2.1.5				
	2.1.32	(R) G 2.1.32				
	2.1.44	(R) G 2.1.44				
	2.1.					
	2.1.42	(S) G 2.1.42				
	2.1.					
	Subtotal		3		1	
2. Equipment Control	2.2.20	(R) G 2.2.20				
	2.2.35	(R) G 2.2.35				
	2.2.42	(R) G 2.2.42				
	2.2.					
	2.2.19	(S) G 2.2.19				
	2.2.38	(F) G. 2.2.38				
	Subtotal		3		2	
3. Radiation Control	2.3.11	(R) G 2.3.11				
	2.3.13	(R) G 2.3.13				
	2.3.					
	2.3.5	(S) G 2.3.5				
	2.3.6	(S) G 2.3.6				
	2.3.					
	Subtotal		2		2	
4. Emergency Procedures / Plan	2.4.19	(R) G 2.4.19				
	2.4.25	(B) G 2.4.25				
	2.4.					
	2.4.3	(S) G 2.4.3				
	2.4.40	(S) G 2.4.40				
	2.4.					
	Subtotal		2		2	
Tier 3 Point Total			10	10	7	7

ES-401, REV 9 (RO) **T3 BWR EXAMINATION OUTLINE** **FORM ES-401-1**

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.32	Conduct of operations	3.8	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to explain and apply all system limits and precautions.
G2.1.44	Conduct of operations	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of RO duties in the control room during fuel handling.
G2.1.5	Conduct of operations	2.9	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate and use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.
G2.2.20	Equipment Control	2.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for managing troubleshooting activities.
G2.2.35	Equipment Control	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine Technical Specification Mode of Operation
G2.2.42	Equipment Control	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications
G2.3.11	Radiation Control	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to control radiation releases.
G2.3.13	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety procedures pertaining to licensed operator duties
G2.4.19	Emergency Procedures/Plans	3.4	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of EOP layout, symbols and icons.
G2.4.25	Emergency Procedures/Plans	3.3	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of fire protection procedures.

ES-401, REV 9	SRO T3 BWR EXAMINATION OUTLINE												FORM ES-401-1
KA	NAME / SAFETY FUNCTION:	IR		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO												
G2.1.42	Conduct of operations	2.5	3.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of new and spent fuel movement procedures
G2.2.19	Equipment Control	2.3	3.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of maintenance work order requirements.
G2.2.38	Equipment Control	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of conditions and limitations in the facility license.
G2.3.5	Radiation Control	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use radiation monitoring systems
G2.3.6	Radiation Control	2.0	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to aprove release permits
G2.4.3	Emergency Procedures/Plans	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to identify post-accident instrumentation.
G2.4.40	Emergency Procedures/Plans	2.7	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the SRO's responsibilities in emergency plan implementation.

ES-301 **Administrative Topics Outline** **Form ES-301-1**

Facility: Brunswick Date of Examination: December 2012
Examination Level: RO ■ *SRO* ■ Operating Test Number: DRAFT

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, N	*Evaluate Status of Operator Licenses* 2.1.4 Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.
Conduct of Operations	R, D	*Evaluate Reactor Water Level Instruments using Caution 1* 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.
Equipment Control	R, D	*Develop a Clearance Boundary - RBCCW Pump 2C* 2.2.13 Knowledge of tagging and clearance procedures
Radiation Control	R, D	*Determine Total Dose for ALARA* 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions
Emergency Procedures/Plan	R, D	***(SRO Only) Determine Offsite Release Rate Per 0PEP-03.4.7*** 2.4.40 Knowledge of SRO responsibilities in Emergency Plan implementation

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

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

Rec'd 2/13/12

Conduct of Operations

Evaluate Status of Operator Licenses R, N

K/A 2.1.4 Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.

This is a new JPM that requires the examinee to determine the active/inactive status of licensed operators under different conditions.

Conduct of Operations

Evaluate Reactor Water Level Instruments using Caution 1 R, D

K/A 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.

This is a bank JPM that requires the examinee to determine operability of reactor water level instruments using Caution 1 of the EOPs.

Equipment Control

Develop a Clearance Boundary - RBCCW Pump 2C R, D

K/A 2.2.13 Knowledge of tagging and clearance procedures.

This is a bank JPM that will require the examinee to develop an equipment clearance manually.

Radiation Control

Determine Total Dose for ALARA R, D

K/A 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions.

This is a bank JPM that will require the examinee to determine the lowest dose path to a work activity.

Emergency Procedures/Plan

(SRO Only) Determine Offsite Release Rate Per 0PEP-03.4.7 R, D

K/A 2.4.40 Knowledge of SRO responsibilities in Emergency Plan implementation.

This is a bank JPM that requires the examinee to determine offsite release rates during accident conditions.

Rec'd 8/13/12

Facility: Brunswick
Exam Level: RO ☑ SRO-I ☑ **SRO-U** ☑

Date of Examination: Dec-12
Operating Test No.: Draft

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Secure Main Turbine with failure of PCB to open	S, A, P	4
b. Resetting CO-FIC-49	S, P	8
c. Manual Start of CREV	S, D, EN	9
d. **Diesel Generator to normal feeder**	S, D	6
e. **HPCI in Pressure Control / Exhaust Diaphragm failure**	S, A, D, L, EN	3
f. RCIC with flow controller failure	S, A, L, D	2
g. **Startup second Reactor Recirc Pump**	S, M, A	1
h. (RO Only) Bypass control rod from RWM	S, D	7
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **SLC with Demin Water**	R, D, L, E	2
j. **HCU Accumulator charging - scram occurs**	R, D, A	1
k. Alignment of RCC Pump from RCC to ADHR Mode	R, N, L	9

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

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

Revised 8/13/12

Simulator JPMs

a. Secure Main Turbine with failure of PCB to open (4)

245000 A2.01 Ability to predict impacts of a turbine trip on the Main Turbine Generator and Auxiliary Systems; and based on those predictions, use procedures to correct, control or mitigate consequences of those abnormal conditions.

This is a previously used (NRC Exam in April. 2010) JPM that will require the examinee to shutdown the turbine. As an alternate path one of the PCBs will fail to auto open and the examinee will have to open the PCB manually.

b. Resetting CO-FIC-49 (8)

291003 K1.03 Operation of a valve controller, including seal-in features
400000 A4.01 Ability to manually operate and/or monitor in the control room CCW indications and control

This is a previously used (NRC Exam in Dec. 2010) simulator JPM that will require the examinee to place the CO-FIC-49 controller (which establishes cooling water flow to the SJAE Condensers) back in service after power was lost to the controller.

c. Manual Start of CREV (9)

290003 A4.01 Ability to manually operate and/or monitor in the control room: Intiate / reset system

This is a banked JPM that will require the examinee to manually start CREV in the high radiation mode for an inspection test.

d. Diesel Generator to normal feeder (6) (U-SRO)

264000 A4.05 Ability to manually operate and/or monitor in the control room: Transfer of emergency generator (with load) to grid

This is a banked JPM. DG3 is loaded and supplying power to E3. The student must unload the DG to place E3 back onto its normal power supply of D bus.

e. HPCI in Pressure Control / Exhaust Diaphragm failure (3) (U-SRO)

295025 EA1.04 Ability to operate and/or monitor the following as they apply to High Reactor Pressure: HPCI (plant specific)

This is a modified alternate path JPM. The modification was to make this an alternate path JPM. The unit has scrammed and the MSIV's are closed. The student is to place HPCI in reactor pressure control mode. After placed in service the exhaust diaphragm breaks and HPCI must be shutdown.

Rec'd 8/13/12

f. RCIC with flow controller failure (2)

295031 EA1.05 Ability to operate and/or monitor the following as they apply to Reactor Low Water Level: Reactor Core Isolation System (plant specific)

This is a banked JPM. Unit has scrammed due to a loss of feedwater; level is below LL2 with HPCI under clearance. RCIC has failed to start.

g. Startup second Reactor Recirc Pump w/ trip of pump(1) (U-SRO)

202001 A4.01 Ability to manually operate and/or monitor in the control room: Recirculation Pumps

This is a modified Alternate path JPM (no longer have MG Sets) that have the examinees preparing to start the second recirc pump. When the pump flow of the running pump is reduced to within limits the only running pump will trip requiring a scram to be inserted and immediate scram actions taken.

h. Bypass control rod from RWM (RO Only) (7)

201006 A2.05 Ability to use procedures to correct or control out of sequence rod movement

This is a banked JPM. A control rod has been inserted to suppress a fuel leak. The student is to bypass the control rod in the RWM sequence.

Neid 8/13/12

In-Plant JPMs

i. SLC with Demin Water (2) (U-SRO)

295031 EA1.08 Ability to operate and/or monitor the following as they apply to Reactor Low Water Level: Alternate Injection Systems

This is a banked JPM that is performed in the RCA. The control room has directed alternate coolant injection with demin water using the SLC pumps per EOP-01-LEP-01.

j. HCU Accumulator charging - scram occurs (1) (U-SRO)

201001 A2.10 Ability to (a) predict the impacts of the following on the CR D Hydraulic System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: †Low HCU accumulator pressure/high level

This is a banked JPM that is performed in the RCA. The student will determine that the cause of a control room alarm is low pressure on an HCU and take actions to re-charge the accumulator. While re-charging the accumulator a reactor scram will occur requiring actions to isolate the drain valve on the HCU.

k. Alignment of RCC Pump from RCC to ADHR Mode (9)

233000 K4.07 Knowledge of Fuel Pool Cooling and Cleanup design features which provide for Supplemental heat removal capability.

This is a new JPM for a new system (ADHR) that was installed in the plant in the last refueling outage. This JPM is performed in the RCA aligning a RCC pump for ADHR operation during a refueling outage (low power).

Neid 8/13/12