

NRC

ES-301

Administrative Topics Outline

Form ES-301-1

Facility: <u>River Bend Station</u>		Date of Examination: <u>12/6/2010</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R,N	(A1) Determine corrected Fuel Zone Level indication and determine whether or not adequate core cooling exists. KA 2.1.25 IR 3.9
Conduct of Operations	R,D	(A2) Using core monitor print out, determine if thermal limits are in spec. KA 2.1.20 IR 4.6
Equipment Control	R,M	(A3) Identify components and sequence for a tagout on HVN-STR1B, TURBINE BLDG PUMP 1A SUCTION STRAINER KA 2.2.13 IR 4.1
Radiation Control	R,M	(A4) Perform a dose assessment and determine acceptability of an RWP. KA 2.3.7 IR 3.5
Emergency Procedures/Plan		

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)

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Administrative Topics Outline

[Form ES-301-1](#)

Facility: <u>River Bend Station</u>		Date of Examination: <u>12/6/2010</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: _____
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R,M	(A5) Determine time to 200°F and whether or not a Recirc Pump may be secured. KA 2.1.25 IR 4.2
Conduct of Operations	R,M	(A6) Given a personnel list and their qualification status, determine if minimum staffing requirements are met. KA 2.1.5 IR 3.9
Equipment Control	R,D	(A7) Review a tag out of LOS-STR1, TURBINE LUBE OIL TRANSFER PUMP SUCTION HEADER STRAINER. KA 2.2.13 IR 4.3
Radiation Control	R,D	(A8) Review a liquid radwaste release permit issued by Chemistry. KA 2.3.6 IR 3.8
Emergency Procedures/Plan	R,M	(A9) Determine Protective Action Recommendations. KA 2.4.44 IR 4.4
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)		

NRC

ES-301

Control Room/In-Plant Systems Outline

Form ES-301-2

Facility: <u>River Bend Station</u>		Date of Examination: 12/6/2010
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: _____

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
(S1) Shift Stator Cooling Water Pumps	A,D,S	4
(S2) Start LPCS in Sup Pool to Sup Pool Lineup w/ pump trip	A,D,S,EN	2
(S3) Start Drywell Low Vol purge to vent the drywell	A,EN,N,L	9
(S4) Shift CRD Pumps with trip of on-coming pump	A,M,S	1
(S5) Restore Offsite power with AOP-0004	D,L,S	6
(S6) Perform Rod Withdrawal Limiter Surveillance (> HPSP)	N,S	7
(C1) Defeat RWCU Level 2 and SLC Initiation Isolation Interlocks	C,D,EN,L	5

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
(P1) Inject into the RPV with Fire Water.	E,L,M,R	8
(P2) Startup RPS MG Set B with failure to achieve voltage	A,M	7
(P3) Place RHR in Sup Pool Cooling mode from Div 2 RSS	D,E,L	5

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

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ES-301
Control Room/In-Plant Systems Outline
Form ES-301-2

Facility: <u>River Bend Station</u>		Date of Examination: 12/6/2010
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: _____

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
(S1) Shift Stator Cooling Water Pumps	A,D,S	4
(S2) Start LPCS in Sup Pool to Sup Pool Lineup w/ pump trip	A,D,S,EN	2
(S3) Start Drywell Low Vol purge to vent the drywell	A,EN,N,L	9
(S4) Shift CRD Pumps with trip of on-coming pump	A,M,S	1
(S5) Restore Offsite power with AOP-0004	D,L,S	6
(S6) Perform Rod Withdrawal Limiter Surveillance (> HPSP)	N,S	7
(C1) Defeat RWCU Level 2 and SLC Initiation Isolation Interlocks	C,D,EN,L	5
(C2) Stuck open SRV fuse removal per AOP-0035	C,D	3
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
(P1) Inject into the RPV with Fire Water.	E,L,M,R	8
(P2) Startup RPS MG Set B with failure to achieve voltage	A,M	7
(P3) Place RHR in Sup Pool Cooling mode from Div 2 RSS	D,E,L	5
<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 (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

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Control Room/In-Plant Systems Outline

Form ES-301-2

Facility: <u>River Bend Station</u>		Date of Examination: 12/6/2010	
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: _____	
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	
(S1) Shift Stator Cooling Water Pumps	A,D,S	4	
(S2) Start LPCS in Sup Pool to Sup Pool Lineup w/ pump trip	A,D,S,EN	2	
(C1) Defeat RWCU Level 2 and SLC Initiation Isolation Interlocks	C,D,EN,L	5	
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
(P1) Inject into the RPV with Fire Water.	E,L,M,R	8	
(P2) Startup RPS MG Set B with failure to achieve voltage	A,M	7	
@ 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 (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$		

Facility: <u>River Bend Station</u>		Scenario No.: <u>1</u>		Op-Test No.:	
Examiners: _____		Operators: _____		_____	
_____		_____		_____	
_____		_____		_____	
<p>Initial Conditions: <u>99% power. Preparing for down power for sequence exchange.</u> <u>EOOS STATUS = 10 GREEN PROTECTED EQUIPMENT DIV I and RCIC</u> <u>DIV III work week. High Pressure Core Spray is available but not operable until the breaker functional is complete.</u></p>					
<p>Turnover: <u>Complete breaker functional per SOP on the High Pressure Core Spray breaker. The pre-start checks have been completed satisfactory. Lower power per GOP-5 Power Maneuvering and the approved reactivity control plan.</u></p>					

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP,SRO)	Perform High Pressure Core Spray Pump Breaker Functional per SOP.
2		R(ATC)	Lower reactor power with control rods.
3	RCIC009 RCIC007	I (BOP,SRO)	Spurious RCIC Isolation. (Technical Specifications) E51-F063 RCIC Steam Supply Inboard Isolation Valve fails to auto close
4	B21005	I (SRO)	B21-PTN078A RPV pressure transmitter fails high. (Technical Specifications)
5	GMC002A GMC001B	C (BOP,SRO)	Stator Cooling Pump A trips, Stby pump fails to AUTO start requiring manual start.
6	GMC002B	C (ALL)	Second Stator Cooling Pump trips / Reactor Scram
7	RPS001A	M (ALL)	RPS Fails to Scram – All Signals
8	FWS004A	C (ATC,SRO)	Feedwater Master Controller output fails low
9	EHC002A	C (ATC,SRO)	Main Turbine Bypass Valves fail OPEN.

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

Total Malfunctions: (5-8): (8) RCIC, E51-MOVF063, B21-PTN078A, Stator Cooling Pumps A & B, ATWS, FWS Controller, BPVs

Malfunctions after EOP entry: (1-2) (2) FWS, BPVs

Abnormal events: (2-4): (2) (AOP-3, AOP-1)

Major transients: (1-2): (1) ATWS

EOPs entered: (1-2): (2)EOP-1, EOP-2

EOP contingencies: (0-2) (1) EOP-1A

Critical tasks: (2-3) (2) Terminate FW injection, Begin control rod insertion.

Facility: <u>River Bend Station</u>		Scenario No.: <u>2</u>	Op-Test No.:
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
<p>Initial Conditions: <u>Mode 1 75% power. Down power in progress. Feedwater pump C is shutdown. EOOS STATUS 10 GREEN(9.8 GREEN when the FWS pump is tagged) PROTECTED EQUIPMENT DIV I work week DIV II protected.</u></p> <p>Turnover: <u>Perform STP-406-0201, DIVISION I FUEL BUILDING HVAC CHARCOAL FILTER A OPERABILITY TEST. Section 6.0 has been completed. Raise reactor power per GOP-005 Power Maneuvering. FWS P1C is off and due to be tagged and drained this shift.</u></p>			
Event No.	Mal. No.	Event Type*	Event Description
1		N (BOP,SRO)	Perform STP-406-0201 Division I Fuel Building HVAC Charcoal Filter A Operability Test
2		R (ATC)	Raise reactor power with reactor recirculation flow.
3	ED004K	C (SRO)	Loss of NJS-LDC1K 480 VAC Load Center (Technical Specification).
4	RMS013A	C (SRO)	RMS-RE13A Control Building Local Intake Monitor fails upscale.(Technical Specification)
5		C (BOP,SRO)	HVC-AOD51A Control Room Isolation damper fails to isolate, but can be manually isolated.
6	CNM004A	C (ATC,SRO)	Condensate pump A trip
7	WCS006	M (ALL)	RWCU leak in the Main Steam Tunnel
8	WCS004 WCS005	C(BOP,SRO)	G33-MOVF004 RWCU Pumps Outboard Isolation valve fails to automatically isolate. G33-MOVF001 RWCU Pumps Inboard Isolation valve fails to automatically isolate but can be manually isolated.
9	MGEN003	C(ATC,SRO)	Main Generator reverse power relay fails.
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Total Malfunctions: (5-8) (7) NJS-LDC1K, RMS-RE13A, HVC-AOD51A, CNM-P1A, RWCU leak, G33-MOVs, Main Turbine

Malfunctions after EOP entry: (1-2) (2) G33-MOVs, Main Turbine

Abnormal events: (2-4) (4) AOP-3, AOP-1, AOP-2, AOP-6

Major transients: (1-2) (1) Steam Tunnel leak

EOPs entered: (1-2) (2) EOP-1, EOP-3

EOP contingencies: (0-2) (0)

Critical tasks: (2-3) (2) Isolate leak, Trip the main turbine

Facility: <u>River Bend Station</u>		Scenario No.: <u>3</u>	Op-Test No.:
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
<p>Initial Conditions: <u>Mode 1, 100%, RCIC tagged out for pump repairs. EOOS STATUS 8.6 YELLOW. DIV III protected. Non-Divisional work week</u></p>			
<p>Turnover: <u>Perform STP-256-0202 Standby Cooling Tower Fan Operability. Perform OSP-0101 section 4.11.3 for the turning gear oil pump pressure switch replacement. .</u></p>			

Event No.	Malfunction No.	Event Type*	Event Description
1		N (SRO,ATC)	Perform OSP-0101 Turbine Generator Periodic Testing Section 4.11.3
2		N (SRO,BOP)	Perform STP-256-0202 Division II Standby Cooling Tower Fans Operability Test. Bank 1 fans only.
3	FWS012	R(ATC)	Loss of Extraction Steam to Feedwater Heater
4		C (SRO,BOP)	HVR-UC1A Containment Unit Cooler trips. (Technical Specifications)
5	CRDM1617	I (SRO,ATC)	Control Rod 16-17 Drifts out (Technical Specifications).
6	CCP001B CCP004A	C (SRO,BOP)	CCP Component Cooling Water Pump B trips, CCP Component Cooling Water Pump A fails to Auto start
7	ED001 EDG001A EDG002B	M(ALL)	Station Blackout <ul style="list-style-type: none"> Loss of offsite power Div 1 DG trips Div 2 DG fails to start
8	SWP004	C (SRO,BOP)	SWP-AOV599 Standby Cooling Tower Inlet Valve fails to auto open.
9	HPCS003	C (SRO,BOP)	High Pressure Core Spray fails to automatically initiate (<i>Pump only, DG starts on LOP to require SWP-AOV599 actions</i>).
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Total Malfunctions: (5-8) (7) Feedwater Heating, HVR UC, Rod Drift, CCP, SBO, SWP-AOV599, HPCS

Malfunctions after EOP entry: (1-2) (2) SWP-AOV599, HPCS

Abnormal events: (2-4) (2) AOP-1, AOP-50

Major transients: (1-2) (1) SBO

EOPs entered: (1-2) (2) EOP-1, EOP-2

EOP contingencies: (0-2) (1) Alternate Level Control

Critical tasks: (2-3) (2) Open SWP-AOV599, Maintain Adequate Core Cooling with HPCS

Facility: <u>River Bend Station</u>	Scenario No.: <u>3</u>	Op-Test No.:
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	
<p>Initial Conditions: <u>Mode 1, 100%, RCIC tagged out for pump repairs. EOOS STATUS 8.6 YELLOW. DIV III protected. Non-Divisional work week</u></p>		
<p>Turnover: <u>Perform STP-256-0202 Standby Cooling Tower Fan Operability. Perform OSP-0101 section 4.11.3 for the turning gear oil pump pressure switch replacement. .</u></p>		

Event No.	Malfunction No.	Event Type*	Event Description
1		N (SRO,ATC)	Perform OSP-0101 Turbine Generator Periodic Testing Section 4.11.3
2		N (SRO,BOP)	Perform STP-256-0202 Division II Standby Cooling Tower Fans Operability Test. Bank 1 fans only.
3	FWS012	R(ATC)	Loss of Extraction Steam to Feedwater Heater
4		C (SRO,BOP)	HVR-UC1A Containment Unit Cooler trips. (Technical Specifications)
5	CRDM1617	I (SRO,ATC)	Control Rod 16-17 Drifts out (Technical Specifications).
6	CCP001B CCP004A	C (SRO,BOP)	CCP Component Cooling Water Pump B trips, CCP Component Cooling Water Pump A fails to Auto start
7	ED001 EDG001A EDG002B	M(ALL)	Station Blackout <ul style="list-style-type: none"> Loss of offsite power Div 1 DG trips Div 2 DG fails to start
8	SWP004	C (SRO,BOP)	SWP-AOV599 Standby Cooling Tower Inlet Valve fails to auto open.
9	HPCS003	C (SRO,BOP)	High Pressure Core Spray fails to automatically initiate (<i>Pump only, DG starts on LOP to require SWP-AOV599 actions</i>).
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Total Malfunctions: (5-8) (7) Feedwater Heating, HVR UC, Rod Drift, CCP, SBO, SWP-AOV599, HPCS

Malfunctions after EOP entry: (1-2) (2) SWP-AOV599, HPCS

Abnormal events: (2-4) (2) AOP-1, AOP-50

Major transients: (1-2) (1) SBO

EOPs entered: (1-2) (2) EOP-1, EOP-2

EOP contingencies: (0-2) (1) Alternate Level Control

Critical tasks: (2-3) (2) Open SWP-AOV599, Maintain Adequate Core Cooling with HPCS

Facility: <u>River Bend Station</u>	Scenario No.: <u>4</u>	Op-Test No.:
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	
<p>Initial Conditions: <u>Mode 1, 50% power. Plant startup in progress. GOP-0001 Step G.29. (2 FWS pumps in service.) EOOS = 10 GREEN. Non-divisional work week. Division III is Protected</u></p> <p>_____</p> <p>_____</p>		
<p>Turnover: <u>Start HDL pumps A & C. Then raise power to 55% per reactivity control plan Step 90. Hold at 55% until chemistry is adequate to Pump Forward. Start RHR A in Sup Pool Cooling lineup to support system flush.</u></p> <p>_____</p>		

Event No.	Mal. No.	Event Type*	Event Description
1		N (ALL)	Start Heater Drain Pumps A & C in Recirc mode.
2		R(ATC)	Raise power to 55% with control rods.
3		N (SRO,BOP)	Start RHR A Residual Heat Removal Pump in Suppression Pool Cooling mode per SOP-0031 to support system flush to reduce dose rates in pump room.
4	RHR002A	C (SRO,BOP)	RHR A Residual Heat Removal Pump trips. (Technical Specifications)
5	RPS003B	C (ALL)	LOSS OF POWER TO RPS CHANNEL B
6	Overrides	C (SRO)	Containment Monitoring System H2 analyzer failure (Technical Specifications)
7	CNM006 RPS001C	M (ALL)	Condensate filter high differential pressure. Total loss of feedwater. Reactor Scram. ARI inserts rods. HPCS failure.
8	RCIC001	C (SRO,BOP)	Reactor Core Isolation Cooling pump turbine trips, but can be manually reset for level control.
9	MSS111P MSS112P	C (SRO,BOP)	MSS-MOV111/112 MSR Steam Supply Valve fails to isolate causing uncontrolled pressure drop.
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Total Malfunctions: (5-8) (7) RHR A, RPS-B loss, CMS, CNM dp, RPS, RCIC, MSS

Malfunctions after EOP entry: (1-2) (2) RCIC, MSS

Abnormal events: (2-4) (3) AOP-1, AOP-2, AOP-10

Major transients: (1-2) (1) Loss of FW, HPCS injection valve failure

EOPs entered: (1-2) (2) EOP-1, EOP-2

EOP contingencies: (0-2) (1) Alternate level control

Critical tasks: (2-3) (3) Insert rods with ARI, Adequate core cooling with RCIC, Close MSIVs or MSS to avoid exceeding cooldown rate.

ES-401

BWR Examination Outline

FORM ES-401-1

Facility Name: River Bend Station														Date of Exam: 12/3/2010					
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	4	4	N/A			3	4	N/A			2	20	0		0	0	
	2	0	1	0				1	3				2	7	0		0	0	
	Tier Totals	3	5	4				4	7				4	27	0		0	0	
2. Plant Systems	1	2	3	2	1	1	2	3	3	4	1	4	26	0		0	0		
	2	2	1	3	2	1	1	0	0	1	1	0	12	0	0	0	0		
	Tier Totals	4	4	5	3	2	3	3	3	5	2	4	38	0		0	0		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1		2	3	4	0
					2		2		3		3			0		0	0	0	

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

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

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

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

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

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

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

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

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

ES-401 BWR Examination Outline Form ES-401-1										
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)										
Q#	E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
1	295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4			0 4				Knowledge of the reasons for reactor scram as it applies to Partial or Complete Loss of Forced Core Flow Circulation.	3.4	1
2	295003 Partial or Complete Loss of AC / 6						01. 07	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
3	295004 Partial or Total Loss of DC Pwr / 6					0 4		Ability to determine and interpret system lineups as it applies to Partial or Total Loss of DC Power.	3.2	1
4	295005 Main Turbine Generator Trip / 3				0 5			Ability to operate and/or monitor reactor turbine pressure regulating system as it applies to Main Turbine Generator Trip.	3.6	1
5	295006 SCRAM / 1	0 3						Knowledge of the operational implications of reactivity control as it applies to SCRAM.	3.7	1
6	295016 Control Room Abandonment / 7						04. 35	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	3.8	1
	295018 Partial or Total Loss of CCW / 8									0
7	295019 Partial or Total Loss of Inst. Air / 8			0 3				Knowledge of the reasons for service air isolation as it applies to Partial or Total Loss of Instrument Air.	3.2	1
8	295021 Loss of Shutdown Cooling / 4				0 5			Ability to operate and/or monitor reactor recirculation as it applies to Loss of Shutdown Cooling.	3	1
9	295023 Refueling Acc / 8					0 2		Ability to determine and interpret pool levels as it applies to refuel accident.	3.4	1
10	295024 High Drywell Pressure / 5		0 6					Knowledge of the interrelations between High Drywell Pressure and Emergency Generators.	3.9	1
11	295025 High Reactor Pressure / 3	0 1						Knowledge of the operational implications of pressure effects on reactor power as it applies to High Reactor Pressure.	3.9	1
12	295026 Suppression Pool High Water Temp. / 5	0 2						Knowledge of the operational implications of steam condensation as it applies to Suppression Pool High Water Temperature.	3.5	1
13	295027 High Containment Temperature / 5		0 2					Knowledge of the interrelations between High Containment Temperature and components internal to the containment.	3.2	1
14	295028 High Drywell Temperature / 5		0 3					Knowledge of the interrelations between High Drywell Temperature and reactor water level indication.	3.6	1
15	295030 Low Suppression Pool Wtr Lvl / 5					0 3		Ability to determine and interpret reactor pressure as it applies to Low Suppression Pool Water Level.	3.7	1
16	295031 Reactor Low Water Level / 2					0 4		Ability to determine and interpret adequate core cooling as it applies to Reactor Low Water Level.	4.6	1
17	295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		0 3					Knowledge of the interrelations between SCRAM condition present and reactor power above APRM downscale or unknown and ARI/RPT/ATWS.	4.1	1
18	295038 High Off-site Release Rate / 9			0 2				Knowledge of the reasons for system isolations as it applies to High Off-site Release Rate.	3.9	1
19	600000 Plant Fire On Site / 8				0 5			Ability to operate and/or monitor plant and control room ventilation systems as it applies to Plant Fire On Site.	3	1
20	700000 Generator Voltage and Electric Grid Disturbances / 6			0 1				Knowledge of the reasons for reactor and turbine trip criteria as it applies to Generator Voltage and Electric Grid Disturbances.	3.9	1
K/A Category Totals:		3	4	4	3	4	2	Group Point Total:		20

ES-401 BWR Examination Outline Form ES-401-1										
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)										
Q#	E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
21	295002 Loss of Main Condenser Vac / 3						01. 32	Ability to explain and apply system limits and precautions.	3.8	1
	295007 High Reactor Pressure / 3									0
22	295008 High Reactor Water Level / 2					0 2		Ability to determine and interpret steam flow feed flow mismatch as it applies to High Reactor Water Level.	3.4	1
	295009 Low Reactor Water Level / 2									0
	295010 High Drywell Pressure / 5									0
	295011 High Containment Temp / 5									0
	295012 High Drywell Temperature / 5									0
	295013 High Suppression Pool Temp. / 5									0
23	295014 Inadvertent Reactivity Addition / 1				0 2			Ability to operate and/or monitor recirculation flow control system as it applies to Inadvertent Reactivity Addition.	3.6	1
	295015 Incomplete SCRAM / 1									0
24	295017 High Off-site Release Rate / 9					0 3		Ability to determine and interpret radiation levels as it applies to High Offsite Release Rate.	3.1	1
	295020 Inadvertent Cont. Isolation / 5 & 7									0
	295022 Loss of CRD Pumps / 1									0
	295029 High Suppression Pool Wtr Lvl / 5									0
25	295032 High Secondary Containment Area Temperature / 5		0 1					Knowledge of the interrelations between High Secondary Containment Area Temperature and area room coolers.	3.5	1
26	295033 High Secondary Containment Area Radiation Levels / 9						04. 08	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8	1
	295034 Secondary Containment Ventilation High Radiation / 9									0
	295035 Secondary Containment High Differential Pressure / 5									0
	295036 Secondary Containment High Sump/Area Water Level / 5									0
27	500000 High CTMT Hydrogen Conc. / 5					0 3		Ability to determine and interpret combustible limits for drywell as it applies to High CTMT Hydrogen Concentration.	3.3	1
K/A Category Totals:		0	1	0	1	3	2	Group Point Total:		7

ES-401		BWR Examination Outline												Form ES-401-1	
Plant Systems - Tier 2/Group 1 (RO)															
Q#	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	#
28	203000 RHR/LPCI: Injection Mode											04.18	Knowledge of the specific bases for EOPs.	3.3	1
29	205000 Shutdown Cooling								06				Ability to (a) predict the impact of SDC/RHR pump trips on Shutdown Cooling and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of that abnormal operation.	3.4	1
	206000 HPCI														0
	207000 Isolation (Emergency) Condenser														0
30	209001 LPCS			02									Knowledge of the effect that a loss or malfunction of the LPCS will have on ADS logic.	3.8	1
31	209002 HPCS				02								Knowledge of HPCS design feature(s) and/or interlock(s) which provide for preventing overfilling of the reactor vessel.	3.4	1
32,33	211000 SLC							03		06			Ability to predict and/or monitor changes in parameters associated with operating SLC controls including pump discharge pressure. Ability to monitor automatic operations of SLC including RWCU system isolation.	3.6; 4	2
34	212000 RPS					02							Knowledge of the operational implications of specific logic arrangements as it applies to RPS.	3.3	1
35,36	215003 IRM		01					01					Knowledge of the electrical power supplies to IRM channels/detectors. Ability to predict and/or monitor changes in parameters associated with operating IRMs controls including detector position.	2.5; 3.4	2
37	215004 Source Range Monitor								01				Ability to (a) predict the impact of degraded power supply on the Source Range Monitor and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of that abnormal operation.	2.7	1
38	215005 APRM / LPRM	04											Knowledge of the physical connections and/or cause-effect relationships between APRM/LPRM and LPRM channels.	3.6	1
39	217000 RCIC											01.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
40,41	218000 ADS	04										01.32	Knowledge of the physical connections and/or cause-effect relationships between ADS and drywell/cocontainment pressures; Ability to explain and apply system limits and precautions.	3.9; 3.8	2
42,43	223002 PCIS/Nuclear Steam Supply Shutoff									01	02		Ability to monitor automatic operations of Nuclear Steam Supply Shutoff including system indicating lights and alarms. Ability to manually operate and/or monitor manually initiation of the Nuclear Steam Supply Shutoff in the control room.	3.4; 3.9	2
44	239002 SRVs		01										Knowledge of the electrical power supplies to SRV solenoids.	2.8	1
45	259002 Reactor Water Level Control			01									Knowledge of the effect that a loss or malfunction of the Reactor Water Level Control System will have on reactor water level.	3.8	1
46,47	261000 SGTS							02				02.22	Ability to predict and/or monitor changes in parameters associated with operating SGTS controls including primary containment pressure. Knowledge of limiting conditions for operations and safety limits.	3.1; 4	2
48	262001 AC Electrical Distribution		01										Knowledge of the electrical power supplies to Offsite Power Sources.	3.3	1
49	262002 UPS (AC/DC)								01				Ability to (a) predict the impact of undervoltage on the UPS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of that abnormal operation.	2.6	1
50	263000 DC Electrical Distribution									01			Ability to monitor automatic operations of DC Electrical Distribution including meters, dials, recorders, alarms, and indicating lights.	3.2	1
51	264000 EDGs									01			Ability to monitor automatic operations of EDGs including automatic starting of compressor and emergency generator.	3	1
52	300000 Instrument Air						13						Knowledge of the effect that a loss or malfunction of filters will have on Instrument Air.	2.8	1
53	400000 Component Cooling Water						06						Knowledge of the effect that a loss or malfunction of heat exchanges will have on Component Cooling Water.	2.9	1
															0
K/A Category Totals:		2	3	2	1	1	2	3	3	4	1	4	Group Point Total:		26

ES-401		BWR Examination Outline												Form ES-401-1	
Plant Systems - Tier 2/Group 2 (RO)															
Q#	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														0
	201002 RMCS														0
	201003 Control Rod and Drive Mechanism														0
	201004 RSCS														0
54	201005 RCIS										0 3		Ability to manually operate and/or monitor RC&IS back panel indicating lights in the control room.	3.4	1
	201006 RWM														0
	202001 Recirculation														0
55	202002 Recirculation Flow Control	1 2											Knowledge of the physical connections and/or cause-effect relationships between Recirculation Flow Control and recirculation flow control valves.	3.7	1
	204000 RWCU														0
	214000 RPIS														0
	215001 Traversing In-core Probe														0
	215002 RBM														0
56	216000 Nuclear Boiler Inst.				1 3								Knowledge of Nuclear Boiler Instrumentation design feature(s) and or interlock(s) which provide for overpressure protection for various low pressure systems.	3.4	1
	219000 RHR/LPCI: Torus/Pool Cooling Mode														0
	223001 Primary CTMT and Aux.														0
	226001 RHR/LPCI: CTMT Spray Mode														0
	230000 RHR/LPCI: Torus/Pool Spray Mode														0
57	233000 Fuel Pool Cooling/Cleanup	1 5											Knowledge of the physical connections and/or cause-effect relationships between Fuel Pool Cooling/Cleanup and storage pools.	2.9	1
	234000 Fuel Handling Equipment														0
58	239001 Main and Reheat Steam			0 1									Knowledge of the effect that a loss or malfunction of the Main and Reheat System will have on turbine generator.	3.2	1
59	239003 MSIV Leakage Control									0 2			Ability to monitor automatic operations of MSIV Leakage Control including main steamline pressure.	3.1	1
60	241000 Reactor/Turbine Pressure Regulator			0 8									Knowledge of the effect that a loss or malfunction of the Reactor/Turbine Pressure Regulator will have on control valves.	3.7	1
61	245000 Main Turbine Gen. / Aux.				0 6								Knowledge of Main Turbine Generator Auxiliaries design feature(s) and or interlock(s) which provide for Generator Protection.	2.7	1
62	256000 Reactor Condensate		0 1										Knowledge of the electrical power supplies to system pumps.	2.7	1
	259001 Reactor Feedwater														0
	268000 Radwaste														0
	271000 Offgas														0
	272000 Radiation Monitoring														0
63	286000 Fire Protection						0 1						Knowledge of the effect that a loss or malfunction of AC electrical distribution will have on Fire Protection.	3.1	1
	288000 Plant Ventilation														0
64	290001 Secondary CTMT			0 1									Knowledge of the effect that a loss or malfunction of the Secondary Containment will have on offsite radioactive release rates.	4	1
	290003 Control Room HVAC														0
65	290002 Reactor Vessel Internals					0 6							Knowledge of the operational implications of heat transfer mechanism as it applies to Reactor Vessel Internals.	2.8	1
K/A Category Totals:		2	1	3	2	1	1	0	0	1	1	0	Group Point Total:		12

Facility Name: River Bend Station Date of Exam: 12/3/2010							
Q#	Category	K/A #	Topic	RO		SRO-Only	
				IR	#	IR	#
66	1. Conduct of Operations	2.1. 01	Knowledge of conduct of operations requirements.	3.8	1		
67		2.1. 31	Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.	4.6	1		
		2.1.					
		2.1.					
		2.1.					
		2.1.					
		Subtotal				2	
68	2. Equipment Control	2.2. 39	Knowledge of less than or equal to one hour Technical Specification action statements for systems.	3.9	1		
69		2.2. 40	Ability to apply Technical Specifications for a system.	3.4	1		
		2.2.					
		2.2.					
		2.2.					
		2.2.					
	Subtotal				2		0
70	3. Radiation Control	2.3. 05	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1		
71		2.3. 13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.4	1		
72		2.3. 14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1		
		2.3.					
		2.3.					
		2.3.					
	Subtotal				3		0
73	4. Emergency Procedures / Plan	2.4. 01	Knowledge of EOP entry conditions and immediate action steps.	4.6	1		
74		2.4. 49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.6	1		
75		2.4. 50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	1		
		2.4.					
		2.4.					
		2.4.					
	Subtotal				3		0
Tier 3 Point Total					10		0

