

**Final Submittal**  
(Blue Paper)

**FINAL OUTLINES**

**NORTH ANNA JUNE 2008 EXAM**  
**05000338/2008301 & 05000339/2008301**

Facility: NORTH ANNA		Date of Exam: JUNE 2008															
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	2	3	4	N/A			3	3	N/A			3	18	3	3	6
	2	0	2	2	N/A			2	2	N/A			1	9	2	2	4
	Tier Totals	2	5	6	N/A			5	5	N/A			4	27	5	5	10
2. Plant Systems	1	3	3	3	4	2	1	3	1	1	4	3	28	2	3	5	
	2	2	0	1	2	0	1	0	1	1	1	1	10	2	1	3	
	Tier Totals	5	3	4	6	2	2	3	2	2	5	4	38	4	4	8	
3. Generic Knowledge and Abilities Categories				1	2	3	4	10					1	2	3	4	7
				3	3	2	2						2	2	1	2	

Note:

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

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1									
000008 Pressurizer Vapor Space Accident / 3					R	S	S00BAG2.4.8(43.5) R00BAH2.24	S4.5 R2.6	
000009 Small Break LOCA / 3						R	R009AG2.4.4	R4.5	
000011 Large Break LOCA / 3		R					R011EK2.02	R2.6	
000015/17 RCP Malfunctions / 4		R					R015/17AK2.07	R2.9	
000022 Loss of Rx Coolant Makeup / 2			R				R022AK3.03	R3.1	
000025 Loss of RHR System / 4				R	S		S025AA2.03(43.5) R025AA1.12	S3.8 R3.6	
000026 Loss of Component Cooling Water / 8					R	S	S026AG2.1.7(43.5) R026AA2.01	S4.7 R2.9	
000027 Pressurizer Pressure Control System Malfunction / 3						R	R027AG2.2.42	R3.9	
000029 ATWS / 1	R						R029EK1.05	R2.8	
000038 Steam Gen. Tube Rupture / 3					S		S038EA2.15(43.5)	S4.4	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		R					R W/E12EK2.1	R3.4	
000054 (CE/E06) Loss of Main Feedwater / 4			R				R054AK3.01	R4.1	
000055 Station Blackout / 6				R			R055EA1.06	R4.1	
000056 Loss of Off-site Power / 6					R	S	S056AG2.2.36(43.2) R056AA2.72	S4.2 R4.1	
000057 Loss of Vital AC Inst. Bus / 6						R	R057AG2.4.45	R4.1	
000058 Loss of DC Power / 6	R						R058AK1.01	R2.8	
000062 Loss of Nuclear Svc Water / 4					S		S062AA2.05(43.5)	S2.5	
000065 Loss of Instrument Air / 8			R				R065AK3.03	A2.9	
W/E04 LOCA Outside Containment / 3									
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			R				R W/E05EK3.4	R3.7	
000077 Generator Voltage and Electric Grid Disturbances / 6				R			R077AA1.01	R3.6	
K/A Category Totals:	R	2	3	4	3	3	3	Group Point Total:	18/6
	S				3	3			

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	S	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1						S	S 005 AA 2.02 (43.5)	S 3.0	
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2									
000032 Loss of Source Range NI / 7			R				R 032 AK 3.01	R 3.2	
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8				R			R 036 AA 1.01	R 3.3	
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4						S	S 051 AG 2.2.44 (43.5)	S 4.4	
000059 Accidental Liquid RadWaste Rel. / 9					R		R 060 AA 2.05	R 3.7	
000060 Accidental Gaseous Radwaste Rel. / 9						S	R 061 AG 2.4.3	R 3.7	
000061 ARM System Alarms / 7						R	S 061 AA 2.04 (43.5)	S 3.5	
000067 Plant Fire On-site / 8									
000068 (BW/A08) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5									
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9		R					R 076 AK 2.01	R 2.6	
W/E01 & E02 Rediagnosis & SI Termination / 3									
W/E13 Steam Generator Over-pressure / 4						S	S W/E13 AG 2.4.20 (43.5)	S 4.3	
W/E15 Containment Flooding / 5		R					R W/E15 EK 2.1	R 2.8	
W/E16 High Containment Radiation / 9			R				R W/E16 EK 3.1	R 2.9	
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 8									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cutdown - Depress. / 4				R			R W/E03 EA 1.2	R 3.7	
BW/E08; CE/A13; W/E09&E10 Natural Circ. / 4					R		R W/E09 EA 2.1	R 3.1	
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	R	0	2	2	2	2	Group Point Total:		9/4

S 2 2

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-2	
System # / Name	1 K	2 K	3 K	4 K	5 K	6 K	7 A	8 A	9 A	10 A	11 G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump											R	R 003A4.07	R2.6	
004 Chemical and Volume Control											R	R 004G2.2.3	R3.8	
005 Residual Heat Removal	R										S	S 005G2.2.40(43.2/43.5) R 005K1.06	S4.7 R3.5	
006 Emergency Core Cooling		R						S				S 006A2.03(43.1) R 006K2.02	S3.7 R2.5	
007 Pressurizer Relief/Quench Tank			R							R	S	S 007G2.2.38(43.1) R 007K3.01 R 007A4.10	S4.5 R3.3 R3.6	
008 Component Cooling Water				R								R 008K4.01	R3.1	
010 Pressurizer Pressure Control					R							R 010K5.01	R3.5	
012 Reactor Protection						R		S				S 012A2.04(43.5) R 012K6.08	S3.2 R3.6	
013 Engineered Safety Features Actuation				R			R					R 013K4.15 R 013A1.07	R2.6 R3.6	
022 Containment Cooling	R								R			R 022K1.04 R 022A2.06	R2.9 R2.8	
025 Ice Condenser														
026 Containment Spray		R									R	R 026K2.01 R 026A4.01	R3.4 R4.5	
039 Main and Reheat Steam											R	R 039G2.1.32	R3.8	
059 Main Feedwater	R										S	S 059G2.1.23(43.5) R 059K1.02	S4.4 R3.4	
061 Auxiliary/Emergency Feedwater		R										R 061K2.01	R3.2	
062 AC Electrical Distribution			R								R	R 062G2.1.27 R 062K3.03	R3.9 R3.7	
063 DC Electrical Distribution				R								R 063K4.01	R2.7	
064 Emergency Diesel Generator			R									R 064K3.02	R4.2	
073 Process Radiation Monitoring					R		R					R 073K5.02 R 073A1.01	R2.5 R3.2	
076 Service Water							R					R 076A1.02	R2.6	
078 Instrument Air				R							R	R 078K4.03 R 078A4.01	R3.1 R3.1	
103 Containment									R			R 103A3.01	R3.9	
K/A Category Point Totals:												R 3 3 3 4 2 1 3 1 1 4 3	Group Point Total:	28/5
												S	2	3

# No 10 CFR 43 reference, but it may be possible to write an SRO level G.

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)											Form ES-401-2													
System # / Name	K1	K2	K3	K4	K5	K6	A7	A8	A9	A10	G11	K/A Topic(s)	IR	#												
001 Control Rod Drive											R	R 001 G2.4.31	R 4.2													
002 Reactor Coolant																										
011 Pressurizer Level Control																										
014 Rod Position Indication																										
015 Nuclear Instrumentation																										
016 Non-nuclear Instrumentation	R											R 016 K1.02	R 3.4													
017 In-core Temperature Monitor							S		R			S 017 A2.02 (43.9) R 017 A4.02	S 4.1 R 2.8													
027 Containment Iodine Removal											S	S 027 G2.2.25 (43.2)	S 4.2													
028 Hydrogen Recombiner and Purge Control			R									R 028 K3.01	R 3.3													
029 Containment Purge				R								R 029 K4.03	R 3.2													
033 Spent Fuel Pool Cooling				R								R 033 K4.05	R 3.1													
034 Fuel Handling Equipment							S					S 034 A2.03 (43.5)	S 4.0													
035 Steam Generator																										
041 Steam Dump/Turbine Bypass Control						R						R 041 K6.03	R 2.7													
045 Main Turbine Generator																										
055 Condenser Air Removal									R			R 055 A3.03	R 2.5													
058 Condensate																										
068 Liquid Radwaste																										
071 Waste Gas Disposal								R				R 071 A2.02	R 3.3													
072 Area Radiation Monitoring																										
075 Circulating Water																										
079 Station Air	R											R 079 K1.01	R 3.0													
088 Fire Protection																										
K/A Category Point Totals:											R	2	0	1	2	0	1	0	1	1	1	1	1	1	Group Point Total:	10/3

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Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.	R G 2.1.20	4.6			
	2.1.	R G 2.1.41	2.8			
	2.1.	R G 2.1.37	4.3			
	2.1.	S G 2.1.4 (43.2)			3.8	
	2.1.	S G 2.1.6 (43.5)			4.8	
	2.1.					
	Subtotal					
2. Equipment Control	2.2.	R G 2.2.1	4.5			
	2.2.	R G 2.2.7	2.9			
	2.2.	R G 2.2.39	3.9			
	2.2.	S G 2.2.35 (43.2)			4.5	
	2.2.	S G 2.2.11 (43.3)			3.3	
	2.2.					
	Subtotal					
3. Radiation Control	2.3.	R G 2.3.4	3.2			
	2.3.	R G 2.3.15	2.9			
	2.3.	S G 2.3.6 (43.4)			3.8	
	2.3.					
	2.3.					
	2.3.					
	Subtotal					
4. Emergency Procedures / Plan	2.4.	R G 2.4.32	3.6			
	2.4.	R G 2.4.9	3.8			
	2.4.	S G 2.4.27 (43.5)			3.9	
	2.4.	S G 2.4.6 (43.5)			4.7	
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
T1/G1	011EK1.01	K/A Topic (BLCA) does not fit with ER 1.01. New randomly selected K/A is: 011EK2.02.
T1/G1	065AK2.02	No K/As in this section with IR 2.5. New randomly selected K/A is: 065AK3.03.
T2/G2	076AK1.08	No K/As in this section with IR 2.5. New randomly selected K/A is: 076AK2.01.
T2/G1	022K6.00	No K/As in this section with IR 2.5. New randomly selected K/A is: 022K1.04.
T2/G1	064K5.02	No K/As in this section with IR 2.5. New randomly selected K/A is: 064K3.02.
T2/G1	078A1.0#	No K/A in this section with IR 2.5. New randomly selected K/A is: 078K4.03
T2/G1	078A2.01	No K/A in this section with IR 2.5. New randomly selected K/A is: 078A4.01
T2/G2	017K2.01	No K/A in this section with IR 2.5. New randomly selected K/A is: 017A4.02
T2/G2	033K5.05	No K/A in this section with IR 2.5. New randomly selected K/A is: 033K4.05
T2/G2	079A3.02	No K/A in this section with IR 2.5. New randomly selected K/A is: 079K1.01
T2/G2	055A1.02	No K/A in this section with IR 2.9. New randomly selected K/A is: 055A3.03
		The following were added per telcom 3/18/08
T2/G1	007 G2.2.38	NO TS. OR TRM ITEMS AT NAPS FOR PRT NEW RANDOMLY SELECTED K/A 007 G2.2.44*
T2/G1	012 K6.08	NAPS DOESN'T HAVE ANY SYSTEM EQUIVALENT TO CLASS NEW RANDOMLY SELECTED K/A 012 K6.04
		The following was added per telcom 5-19-08
T2/G1	007 G2.2.44*	could not develop discriminating SPD level question NEW RANDOMLY SELECTED K/A 064 G2.2.38

S  
R  
S

6/14



Facility: North Anna		Date of Exam: 6/24/08		Exam Level: RO <input checked="" type="checkbox"/> SRO <input checked="" type="checkbox"/>		
Item Description	Initial					
	a	b*	c*			
1. Questions and answers are technically accurate and applicable to the facility.	CS	AS	MBS BRL			
2. a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.	CS	AS	MBS BRL			
3. SRO questions are appropriate in accordance with Section D.2.d of ES-401	CS	AS	MBS BRL			
4. The sampling process was random and systematic (If more than 4 RO or 2 SRO questions were repeated from the last 2 NRC licensing exams, consult the NRR OL program office).	CS	AS	MBS BRL			
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: <input checked="" type="checkbox"/> the audit exam was systematically and randomly developed; or <input type="checkbox"/> the audit exam was completed before the license exam was started; or <input type="checkbox"/> the examinations were developed independently; or <input type="checkbox"/> the licensee certifies that there is no duplication; or <input type="checkbox"/> other (explain)	CS	AS	MBS BRL			
6. Bank use meets limits (no more than 75 percent from the bank, at least 10 percent new, and the rest new or modified); enter the actual RO / SRO-only question distribution(s) at right.	Bank	Modified	New	CS	AS	MBS BRL
	12 / 0	12 / 2	5 / 23			
7. Between 50 and 60 percent of the questions on the RO exam are written at the comprehension/ analysis level; the SRO exam may exceed 60 percent if the randomly selected K/As support the higher cognitive levels; enter the actual RO / SRO question distribution(s) at right.	Memory	C/A		CS	AS	MBS BRL
	35 / 6	40 / 19				
8. References/handouts provided do not give away answers or aid in the elimination of distractors.	CS	AS	MBS BRL			
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.	CS	AS	MBS BRL			
10. Question psychometric quality and format meet the guidelines in ES Appendix B.	CS	AS	MBS BRL			
11. The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.	CS	AS	MBS BRL			
Printed Name / Signature		Date				
a. Author	S. R. Allen / 8/2	6/24/08				
b. Facility Reviewer (*)	Walt Shupe / 1/24/08	6/24/08				
c. NRC Chief Examiner (#)	MARK A. BATES / 12/10/05 / BRUNO CABALLERO - B. Caballero	6/19/08				
d. NRC Regional Supervisor	MALCOLM T. WIDMANN / [Signature]	06/14/08				
Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.						

ES-301

## Administrative Topics Outline

Form ES-301-1

Facility: <b>North Anna Power Station</b>		Date of Examination: <u>6/2008</u>
Examination Level: <b>Combined (See Below)</b>		Operating Test Number: <u>1</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed (KA)
Conduct of Operations	M, R	Determine the Quadrant Power Tilt Ratio by hand calculation (1-PT-23) and determine maximum allowable power level based on the calculation. <b>(ALL) (G2.1.7, RO 4.4 / SRO 4.7)</b>
Conduct of Operations	N, R	Determine minimum RHR flow based on time after shutdown and determine minimum RCS level to support that flowrate (using 1-AP-11, Loss of RHR). <b>(ALL) (G2.1.25, RO 3.9 / SRO 4.2)</b>
Equipment Control	N, R	Evaluate and apply Tech Specs and procedure requirements based on UNSAT condition from QTRLY PORV Block valve surveillance (1-PT-44.7). (1) <b>(ALL) (G2.2.40, RO 3.4 / SRO 4.7)</b>
Radiation Control	N, R	Select appropriate RWP and calculate Stay Time <b>(ALL) (G2.3.7, RO 3.5 / SRO 3.6)</b>
Emergency Plan	M, R	Classify event and determine PAR (modified, activity was performed on previous 2 exams) <b>(SRO ONLY) (G2.4.41, RO 2.9 / SRO 4.6)</b>
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 ( $\leq 3$ for ROs; $\leq \infty$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

(1) – For SRO Candidates there is one additional element that is not included in the RO JPM.

Rec'd  
5/27/08

5/27/08

Facility: North Anna Date of Examination: 6/2008  
 Exam Level: RO  SRO-I  SRO-U  Operating Test No.: 1

Control Room Systems<sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title (KA)	Type Code*	Safety Function
a. Emergency Borate for stuck rods following Reactor Trip (1-ES-0.1) (MOV-1350 will not open) 024 - A4.01, Ability to determine and interpret the following as they apply to the Emergency Boration: Whether boron flow and/or MOVs are malfunctioning, from plant conditions (3.8/4.1) (CFR: 43.5 / 45.13)	A, M, S, E, L	1
b. Respond to misaligned control rod, during realignment rod will drop causing negative rate trip; (turbine fails to trip causing SI actuation, SI fails to automatically actuate but can be manually actuated). 013 - A4.03, Ability to manually operate and/or monitor in the control room: ESFAS initiation (4.5/4.7) (CFR: 41.7 / 45.5 to 45.8)	A, N, S, EN	2
c. Transfer an emergency bus from an emergency diesel generator to a reserve station service transformer 064-A4.07, Ability to manually operate and/or monitor in the control room: Transfer ED/G (with load) to grid (3.4/3.4) (CFR: 41.7 / 45.5 to 45.8)	D, S	6
d. Respond to Loss of RHR in Mode 4 (1-AP-11) 005 - A2.03, Ability to (a) predict the impacts of the following malfunctions or operations on the RHRs; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR pump/motor Malfunction (2.9/3.1) (CFR: 41.5 / 43.5 / 45.3 / 45.5)	A, M, P, L, S	4 (Pri)
e. Respond to failure of non-controlling 1 <sup>st</sup> Stage pressure transmitter (1-AP-3); after transfer to pressure mode controller setpoint fails low steam dumps must be placed in off (1-AP-38) 041 - A4.04, Ability to manually operate and/or monitor in the control room: Pressure Mode (2.7/2.7) (CFR: 41.7 / 45.5 to 45.8)	A, M, S, P	4 (SEC)
f. Add Nitrogen to PRT 007 - A1.02, Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank pressure (2.7/2.9) (CFR: 41.5 / 45.5)	D, S, P	5
g. Respond to Recirc Spray Heat Exchanger radiation monitor alarm (1-AP-5) 073 - A4.01, Ability to manually operate and/or monitor in the control room: Effluent release (3.9/3.9) (CFR: 41.7 / 45.5 to 45.8)	D, C, E	7
h. Respond to loss of 1 or more Circ Water Pumps (1-AP-13) 075 - A2.02, Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of Circulating Water Pumps (2.5/2.7) (CFR: 41.5 / 43.5 / 45/3 / 45/13)	N, S	8

In-Plant Systems<sup>®</sup> (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. Open the residual heat removal heat exchanger cooling water return valves using a jumper (1-AP-28, 0-FCA-1). 008-A2.05, Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of loss of instrument and control air on the position of the CCW valves that are air operated (3.3/3.5) (CFR: 41.5 / 43.5 / 45/3 / 45/13)	D, E, R	8
j. Re-energize a 120-volt vital bus from its inverter (1-MOP-26.6, 0-AP-10) 057 - AA1.01, Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual Inverter Swapping (3.7/3.7) (CFR 41.7 / 45.5 / 45.6)	D, E	6
k. Trip the reactor locally by opening the Reactor Trip Breakers or the rod-drive motor generator breakers 029 - EA1.12, Ability to operate and monitor the following as they apply to a ATWS: M/G set power supply and reactor trip breakers (4.1/4.0) (CFR 41.7 / 45.5 / 45.6)	A, D, E	1

<sup>®</sup> 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 (similar topic)	≥ 3 / ≥ 3 / ≥ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: North Anna Date of Examination: 6/2008  
 Exam Level: RO  SRO-I  SRO-U  Operating Test No.: 1

Control Room Systems<sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title (KA)	Type Code*	Safety Function
a. Emergency Borate for stuck rods following Reactor Trip (1-ES-0.1) (MOV-1350 will not open) 024 - AA2.01, Ability to determine and interpret the following as they apply to the Emergency Boration: Whether boron flow and/or MOVs are malfunctioning, from plant conditions (3.8/4.1) (CFR: 43.5 / 45.13)	A, M, S, E, L	1
b. Respond to misaligned control rod, during realignment rod will drop causing negative rate trip; (turbine fails to trip causing SI actuation, SI fails to automatically actuate but can be manually actuated). 013 - A4.03, Ability to manually operate and/or monitor in the control room: ESFAS initiation (4.5/4.7) (CFR: 41.7 / 45.5 to 45.8)	A, N, S, EN	2
c. Transfer an emergency bus from an emergency diesel generator to a reserve station service transformer 064-A4.07, Ability to manually operate and/or monitor in the control room: Transfer ED/G (with load) to grid (3.4/3.4) (CFR: 41.7 / 45.5 to 45.8)	D, S	6
d. Respond to Loss of RHR in Mode 4 (1-AP-11) 005 - A2.03, Ability to (a) predict the impacts of the following malfunctions or operations on the RHRs; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR pump/motor Malfunction (2.9/3.1) (CFR: 41.5 / 43.5 / 45.3 / 45.5)	A, M, P, L, S	4 (Pri)
e. Respond to failure of non-controlling 1 <sup>st</sup> Stage pressure transmitter (1-AP-3); after transfer to pressure mode controller setpoint fails low steam dumps must be placed in off (1-AP-38) 041 - A4.04, Ability to manually operate and/or monitor in the control room: Pressure Mode (2.7/2.7) (CFR: 41.7 / 45.5 to 45.8)	A, M, S, P	4 (SEC)
f. Not used for SRO-I candidates	N/A	N/A
g. Respond to Recirc Spray Heat Exchanger radiation monitor alarm (1-AP-5) 073 - A4.01, Ability to manually operate and/or monitor in the control room: Effluent release (3.9/3.9) (CFR: 41.7 / 45.5 to 45.8)	D, C, E	7
h. Respond to loss of 1 or more Circ Water Pumps (1-AP-13) 075 - A2.02, Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of Circulating Water Pumps (2.5/2.7) (CFR: 41.5 / 43.5 / 45/3 / 45/13)	N, S	8

In-Plant Systems<sup>®</sup> (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. Open the residual heat removal heat exchanger cooling water return valves using a jumper (1-AP-28, 0-FCA-1). 008-A2.05, Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of loss of instrument and control air on the position of the CCW valves that are air operated (3.3/3.5) (CFR: 41.5 / 43.5 / 45/3 / 45/13)	D, E, R	8
j. Re-energize a 120-volt vital bus from its inverter (1-MOP-26.6, 0-AP-10) 057 - AA1.01, Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual Inverter Swapping (3.7/3.7) (CFR 41.7 / 45.5 / 45.6)	D, E	6
k. Trip the reactor locally by opening the Reactor Trip Breakers or the rod-drive motor generator breakers 029 - EA1.12, Ability to operate and monitor the following as they apply to a ATWS: M/G set power supply and reactor trip breakers (4.1/4.0) (CFR 41.7 / 45.5 / 45.6)	A, D, E	1

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6/2008

Facility: North Anna Date of Examination: 6/2008  
 Exam Level: RO  SRO-I  SRO-U  Operating Test No.: 1

Control Room Systems<sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title (KA)	Type Code*	Safety Function
a. Not used for SRO-U candidates	N/A	N/A
b. Respond to misaligned control rod, during realignment rod will drop causing negative rate trip; (turbine fails to trip causing SI actuation, SI fails to automatically actuate but can be manually actuated). 013 - A4.03, Ability to manually operate and/or monitor in the control room: ESFAS initiation (4.5/4.7) (CFR: 41.7 / 45.5 to 45.8)	A, N, S, EN	2
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d. Respond to Loss of RHR in Mode 4 (1-AP-11) 005 - A2.03, Ability to (a) predict the impacts of the following malfunctions or operations on the RHRs; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR pump/motor Malfunction (2.9/3.1) (CFR: 41.5 / 43.5 / 45.3 / 45.5)	A, M, P, L, S	4 (Pri)
e. Not used for SRO-U candidates	N/A	N/A
f. Not used for SRO-U candidates	N/A	N/A
g. Not used for SRO-U candidates	N/A	N/A
h. Not used for SRO-U candidates	N/A	N/A

In-Plant Systems<sup>®</sup> (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

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k. Trip the reactor locally by opening the Reactor Trip Breakers or the rod-drive motor generator breakers 029 - EA1.12, Ability to operate and monitor the following as they apply to a ATWS: M/G set power supply and reactor trip breakers (4.1/4.0) (CFR 41.7 / 45.5 / 45.6)	A, D, E	1

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12:00  
6/17/08