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NRC Exam

Facility: **Watts Bar** Date of Exam: **May 2008** **RO**

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	1	5	N/A			3	4	N/A		3	18			
	2	1	3	2				1	1			1	9			
	Tier Totals	3	4	7				4	5			4	27			
2. Plant Systems	1	3	2	3	4	2	1	3	4	2	2	2	28			
	2	2	-	1	-	1	1	1	1	-	1	2	10			
	Tier Totals	5	2	4	4	3	2	4	5	2	3	4	38			
3. Generic Knowledge and Abilities		1			2			3			4		10	1	2	3	4	
		3			2			2			3							

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/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.
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.

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NRC Exam

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 **(RO)**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1			**01**				Reason for actions contained in EOP for reactor trip	4.0	1
000009 Small Break LOCA / 3		**03**					Interrelation between S/Gs and small break LOCA	3.0	1
000015/17 RCP Malfunctions / 4	**03**						Basis for reduced power with one RCP out of service	3.0	1
000022 Loss of Reactor Coolant Makeup / 2						**2.4.31**	Alarms, indications, and response procedures	4.2	1
000025 Loss of RHR System / 4			**02**				RHR low press piping isolation	3.3	1
000026 Loss of Component Cooling Water / 8				**02**			Monitor loads on CCW system from control room	3.2	1
000027 Pressurizer Pressure Control System Malfunction / 3					**02**		Normal values for RCS pressure	3.8	1
000038 Steam Gen. Tube Rupture / 3						**2.2.40**	Apply Tech Specs	3.4	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					**02**		Adhere to procs and operate within limits of license	3.4	1
000055 Station Blackout / 6				**01**			Operate/monitor incore thermocouples	3.7	1
000057 Loss of Vital AC Elec. Inst. Bus / 6			**01**				Reasons for EOP actions	4.1	1
000058 Loss of DC Power / 6	**01**						Op imps of battery chrgr and instrumentation	2.8	1
000062 Loss of Nuclear Service Water / 4					**02**		Determine/interpret cause of SWS leak	2.9	1
000065 Loss of Instrument Air / 8			**04**				Reason for crossover to backup air supplies	3.0	1
W/E04 LOCA Outside Containment / 3			**03**				Manipulation of controls for desired results	3.8	1
W/E11 Loss of Emergency Coolant Recirc. / 4				**03**			Monitor for desired results	3.7	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					**02**		Adhere to procs and operate within limits of license	3.7	1
000077 Generator Voltage and Electric Grid Disturbances / 6						**2.1.20**	Interpret and execute procedure steps	4.6	1
K/A Category Point Totals:	**2**	**1**	**5**	**3**	**4**	**3**	Group Point Total:		**18**

NRC Exam

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1		01					Rod bank step counters	2.9	1
000028 Pressurizer Level Malfunction / 2	01						PZR reference leak abnormalities	2.8	1
000032 Loss of Source Range NI / 7		01					Power supplies, incl proper switch positions	2.7	1
000059 Accidental Liquid RadWaste Rel. / 9			01				Reasons for termination of a release	3.5	1
000067 Plant Fire On-site / 8				07			Operate/mon fire alarm reset panel	2.9	1
000069 (W/E14) Loss of CTMT Integrity / 5					01		Determine conditions and select procedures	3.3	1
000076 High Reactor Coolant Activity / 9						2.2.38	Conditions and limitations in facility license	3.6	1
W/EO1 & E02 Rediagnosis & SI Termination / 3			02				Procedures associated with SI Termination	3.3	1
W/E13 Steam Generator Over-pressure / 4		01					Component interlocks, failure modes, etc.	3.0	1
K/A Category Point Totals:	1	3	2	1	1	1	Group Point Total:		9

NRC Exam

ES-401	PWR Examination Outline Plant Systems- Tier 2/Group 1 (RO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump			04									Effect on RPS of RCP malf	3.9	1
004 Chemical and Volume Control				14								L/D tank bypass valve	2.8	1
005 Residual Heat Removal					09							Dilution/boration consider	3.2	1
006 Emergency Core Cooling						02						Eff. of core flood tanks malf	3.4	1
007 Pressurizer Relief/Quench Tank							02					Maintain PRT tank pressure	2.7	1
008 Component Cooling Water								02				High/low surge tank level	3.2	1
010 Pressurizer Pressure Control									01			Monitor during PORV test	3.0	1
	08											Cause/eff with PZR level	3.2	1
012 Reactor Protection											2.4.31	Alarms, response procs	4.2	1
013 Engineered Safety Features Actuation										02		Reset ESFAS channels	4.3	1
022 Containment Cooling									01			Monitor auto operation	4.1	1
025 Ice Condenser								05				Abnormal glycol tank level	2.5	1
026 Containment Spray							03					Containment sump level	3.5	1
039 Main and Reheat Steam					08							Steam removal eff on react	3.6	1
								03				Rad mon inds for SGTR	3.4	1
059 Main Feedwater				05								Control MFP speed	2.5	1
061 Auxiliary/Emergency Feedwater			02									AFW malf effect on S/G	4.2	1
062 AC Electrical Distribution		01										Power supp to system loads	3.3	1
063 DC Electrical Distribution	02											Cause/eff with AC system	2.7	1
064 Emergency Diesel Generator		02										Power supp to fuel oil pps	2.8	1
				05								Incomplete start relay	2.8	1
073 Process Radiation Monitoring			01									PRM malf eff on release	3.6	1
											2.4.35	Local AO tasks and effects	3.8	1
076 Service Water				03								CCW hx isolation valves	2.9	1
							02					Rx/turb bldg water temps	2.6	1
078 Instrument Air	01											Sensor air	2.8	1
103 Containment								05				Emergency entry	2.9	1
										09		Cont. vacuum system	3.1	1
K/A Category Point Totals:	3	2	3	4	2	1	3	4	2	2	2	Group Point Total:		28

NRC Exam

ES-401 PWR Examination Outline Plant Systems- Tier 2/Group 2 (RO) Form ES-401-2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
014 Rod Position Indication								**02**				Power loss to RPIS	3.1	1
028 Hydrogen Recombiner andPurge Control							**02**					Predict effect on cont pressure	3.4	1
033 Spent Fuel Pool Cooling											**2.2.36**	Effect of maint on LCO status	3.1	1
045 Main Turbine Generator					**17**							Effect on reactor of raising load	2.5	1
055 Condenser Air Removal											**2.4.3**	Identify post-accident instrument	3.7	1
056 Condensate	**03**											Cause/eff with MFW	2.6	1
068 Liquid Radwaste						**10**						Rad mon eff on on Liq Rad Sys	2.5	1
075 Circulating Water	**02**											Interface with radwaste discharge	2.9	1
079 Station Air										**01**		Cross-tie with IAS	2.7	1
086 Fire Protection			**01**									FPS malf eff on S/D capability eqp	2.7	1
K/A Category Point Totals:	**2**	--	**1**	--	**1**	**1**	**1**	**1**	--	**1**	**2**	Group Point Total:		**10**

ES-401	Generic Knowledge and Abilities Outline (Tier 3)	Form ES-401-3

NRC EXAM

Facility: **Watts Bar**	Date of Exam: **May 2008**					**RO**
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.5	Ability to use procedures related to staffing/overtime.	2.9	1		
	2.1.28	Purpose of major system components/controls	4.1	1		
	2.1.36	Procedures/limitations for core alterations	3.0	1		
	Subtotal			3		
2. Equipment Control	2.2.12	Knowledge of surveillance procedures	3.7	1		
	2.2.44	Interpret control room indications	4.2	1		
	Subtotal			2		
3. Radiation Control	2.3.7	Ability to comply with radiation work permits	3.5	1		
	2.3.14	Knowledge of radiation or contamination hazards	3.4	1		
	Subtotal			2		
4. Emergency Procedures / Plan	2.4.13	Knowledge of crew roles during EOP usage	4.0	1		
	2.4.37	Knowledge of lines of authority during E-plan.	3.0	1		
	2.4.42	Knowledge of emergency response facilities	2.6	1		
	Subtotal			3		
Tier 3 Point Total				10		

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ES-401 **PWR Examination Outline** **Form ES-401-2**

NRC EXAM

Facility: **Watts Bar** Date of Exam: **May 2008** **SRO**

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				N/A					N/A				3	3	6
	2													2	2	4
	Tier Totals													5	5	10
2. Plant Systems	1													3	2	5
	2													1	2	3
	Tier Totals													4	4	8
3. Generic Knowledge and Abilities		1			2			3			4			1	2	3	4	7
														2	1	2	2	

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/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.
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.

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NRC EXAM

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					5		Interpret reactor trip first-out indication	3.9	1
000022 Loss of Reactor Coolant Makeup / 2						2.1.7	Evaluate plant perf and make operational judgements	4.7	1
000025 Loss of RHR System / 4					1		Interpret running RHR pump amperage	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3						2.4.6	EOP mitigation strategies	4.7	1
000058 Loss of DC Power / 6					1		Determine loss of DC power has occurred/backups I/S	4.1	1
W/E11 Loss of Emergency Coolant Recirc. / 4						2.2.22	Knowledge of LCOs and safety limits	4.7	1
K/A Category Point Totals:	--	--	--	--	3	3	Group Point Total:		6

NRC EXAM

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000059 Accidental Liquid RadWaste Rel. / 9					3		Misleading Rad Mon inds for accidental release	3.6	1
000068 (BW/A06) Control Room Evac. / 8						2.4.8	Use of abnormal procs in conj with EOPs	4.5	1
W/E13 Steam Generator Over-pressure / 4					1		Interpret conditions and select appr procedures	3.4	1
CE/A11; W/E08 RCS Overcooling - PTS / 4						2.4.18	Specific bases for EOPs	4.0	1
K/A Category Point Totals:	--	--	--	--	2	2	Group Point Total:		4

NRC EXAM

ES-401	PWR Examination Outline Plant Systems- Tier 2/Group 1 (SRO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump								5				Effect of VCT press	2.8	1
012 Reactor Protection											2.2.44	Verify system status	4.4	1
061 Auxiliary/Emergency Feedwater								9				Total loss of feedwater	**TBD	1
064 Emergency Diesel Generator											2.2.37	Determine operability	4.6	1
076 Service Water								1				Loss SWS	3.7	1
K/A Category Point Totals:	--	--	--	--	--	--	--	3	--	--	2	Group Point Total:		5

*** (TBD): Please note: Internal discussion with exam team members determined that the Importance Rating of K/A 061A2.09 is greater than 2.5. This discussion included the following points:

1. Safety significance of total loss of FW on Watts Bar Nuclear Plant operation and entry into Emergency Operating Procedures.
2. Recent industry operating experience related to total loss of feedwater.

NRC EXAM

ES-401	PWR Examination Outline Plant Systems- Tier 2/Group 2 (SRO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
011 Pressurizer Level Control											2.1.32	Limits and precautions	4.0	1
075 Circulating Water								3				Safety features	2.7	1
086 Fire Protection											2.4.9	Mitigation for low power	4.2	1
K/A Category Point Totals:	--	--	--	--	--	--	--	1	--	--	2	Group Point Total:		3

ES-401	Generic Knowledge and Abilities Outline (Tier 3)	Form ES-401-3

NRC EXAM

Facility: **Watts Bar**	Date of Exam: **May 2008**					**SRO**
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.23	Perform system and integrated procedures all modes			4.4	1
	2.1.34	Knowledge of primary/secondary plant chemistry limits			3.5	1
	Subtotal					2
2. Equipment Control	2.2.40	Ability to apply Tech Specs for a system			4.7	1
	Subtotal					1
3. Radiation Control	2.3.6	Ability to approve release permits			3.8	1
	2.3.15	Knowledge of radiation monitoring equipment			3.1	1
	Subtotal					2
4. Emergency Procedures / Plan	2.4.23	Basis for prioritizing emergency procedures implementation			4.4	1
	2.4.29	Knowledge of the emergency plan			4.4	1
	Subtotal					2
Tier 3 Point Total						7

RO Examination		
Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	000022 Category K2	Category K2 has no K/As with importance rating ≥ 2.5. Randomly selected Category G, with a randomly selected K/A of 2.4.31.
1/1	000058 Category K2	Category K2 has no K/As with importance rating ≥ 2.5. Randomly selected Category K1 with a randomly selected K/A of K1.01.
1/1	000062 Category K1	Category K1 contains no K/As. Randomly selected another category (K2). This category also contains no K/As. Continued random selection of categories and obtained Category A2, with a K/A of A2.02.
1/1	000065 Category K2	Category K2 has no K/As with importance rating ≥ 2.5. Randomly selected Category K3 with a randomly selected K/A of K3.04.
1/2	000076AA1.04	Failed fuel monitor not part of current design basis at Watts Bar. Since there were no other K/As in Category A1 with importance rating ≥ 2.5, selected another Category, obtaining Category Generic. Note: this Category re-selection was not entirely random, but was implemented in order to improve sampling balance in Category Generic, for Tier 1, Group 2. After selecting G Category, performed a random sample, and obtained G2.2.38.
2/1	005K5.04	Low importance rating (2.1). Randomly resampled and obtained 005K5.09.
2/1	039 Category K6	Category K6 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category K5.
2/1	078 Category K5	Category K5 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category K1.
2/1	103 Category K6	Category K6 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category A2.
2/1	026A1.05	Chemical additive tank for Cont. Spray not part of Watts Bar design. Randomly resampled remaining K/As in Category A1 and obtained A1.03.
2/2	033 Category K6	Category K6 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category A4.
2/2	033 Category A4	Category A4 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category G.
2/2	045K5.08	Low importance rating (1.8). Resampled and obtained K5.10. Resampled repeatedly (due to numerous low importance ratings) until obtaining K5.17.
2/2	055 Category K4.	Category K4 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category G.
2/2	056 Category K3	Category K3 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category A1.
2/2	056 Category A1	Category A1 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category K1.
2/2	068 Category K2	Category K2 has no K/As with importance rating ≥ 2.5. Randomly resampled and obtained Category K6.
2/2	075K1.05	Low importance rating (2.0). Resampled and obtained K1.02.
2/2	079 Category K2	Category K2 has only one K/A and it has a low importance rating (2.3). Resampled and obtained Category A1.

2/2	079 Category A1	Category A1 has no associated K/As. Resampled and obtained Category K5.
2/2	079 Category K5.	Category K5 has no K/As with importance rating ≥ 2.5. Resampled and obtained Category A4.
SRO Examination		
Tier / Group	Randomly Selected K/A	Reason for Rejection
3	2.1.28	Not linked to 10 CFR 55.43. Randomly resampled and obtained 2.1.3.
3	2.1.3	Not linked to 10 CFR 55.43. Randomly resampled and obtained 2.1.34.
3	2.4.37	Not linked to 10 CFR 55.43. Randomly resampled and obtained 2.4.31.
3	2.4.31	Not linked to 10 CFR 55.43. Randomly resampled and obtained 2.4.23.
1/1	000022 G2.1.28	Not linked to 10 CFR 55.43. Randomly resampled and obtained 2.1.7
2/2	011 G2.1.31	Not linked to 10 CFR 55.43. Randomly resampled and obtained 2.1.32.

Facility: WATTS BAR	Date of Examination: May 2008
Examination Level (circle one): RO / SRO	Operating Test Number 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N	Hand calculation of Boric Acid & Primary Water integrator settings for a manual makeup to the VCT.
Conduct of Operations	N	Determine work hour restrictions.
Equipment Control	N	Hand calculation of RCS water inventory balance 1-SI-68-32.
Radiation Control	M	Calculate radiation dose to perform job in an area with two possible access routes and determine if dose exceeds administrative limits.

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

* Type Codes & Criteria

(C)ontrol room, (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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Facility: **WATTS BAR** Date of Examination: **May 2008**

Examination Level (circle one): **RO** (**SRO**) Operating Test Number **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N	SRO review of hand calculation of Boric Acid & Primary Water integrator settings for a manual makeup to the VCT (must find error).
Conduct of Operations	N	Determine work hour restrictions.
Equipment Control	N	Hand calculation of RCS water inventory balance, 1-SI-68-32.
Radiation Control	M	Calculate radiation dose to perform job in an area with two possible access routes and determine if dose exceeds administrative limits.
Emergency Plan	M	Classify the event per the REP and determination of PAR, per EPIP 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 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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ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: **Watts Bar**	Date of Examination: **May 2008**
Exam Level: **RO**	Operating Test No.: **1**

B.1 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.	Synchronize Main Turbine to grid with failure of automatic voltage regulator.	MALS	4S
b.	Manual makeup to VCT with failure of Primary Water to automatically stop.	MAS	1
c.	Transfer Containment Spray Suction to Containment Sump Per ES-1.3.	DS	5
d.	Raise Cold Leg Accumulator Level.	DENS	3
e.	Transfer from two RHR train operation to single (A) RHR train operation with failure of mini flow valve to automatically open.	MALS	4P
f.	Respond to a Source Range instrument failure.	DS	7
g.	Restore charging and letdown with failure of letdown temperature controller.	NAS	2
h.	Place Upper Containment Purge in service.	NS	8

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

a.	Local S/G level control from Motor Driven AFW Pump.	DRE	4S
b.	1A-A Diesel Generator idle start for warmup.	D	6
c.	Local emergency boration	DREA	1

@ 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	

Facility: **Watts Bar**	Date of Examination: **May 2008**
Exam Level: **SRO-I**	Operating Test No.: **1**

B.1 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.	(Not required for SRO-I.) SNMC Lee Cert		
b.	Manual makeup to VCT with failure of Primary Water to automatically stop.	MAS	1
c.	Transfer Containment Spray Suction to Containment Sump Per ES-1.3.	DS	5
d.	Raise Cold Leg Accumulator Level.	DENS	3
e.	Transfer from two RHR train operation to single (A) RHR train operation with failure of mini flow valve to automatically open. REPLACED WITH FR H.1	MALS	4P
f.	~~Respond to a Source Range instrument failure.~~ ADJ NIS	DS	7
g.	Restore charging and letdown with failure of letdown temperature controller.	NAS	2
h.	Place Upper Containment Purge in service.	NS	8

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

a.	Local S/G level control from Motor Driven AFW Pump.	DRE	4S
b.	1A-A Diesel Generator idle start for warmup.	D	6
c.	Local emergency boration	DREA	1

@ 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	

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

Facility: **Watts Bar**	Date of Examination: **May 2008**
Exam Level: **SRO-U**	Operating Test No.: **1**

B.1 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.	(Not required for SRO-U.)		
b.	(Not required for SRO-U.)		
c.	(Not required for SRO-U.)		
d.	Raise Cold Leg Accumulator Level.	DENS	3
e.	Transfer from two RHR train operation to single (A) RHR train operation with failure of mini flow valve to automatically open.	MALS	4P
f.	(Not required for SRO-U.)		
g.	Restore charging and letdown with failure of letdown temperature controller.	NAS	2
h.	(Not required for SRO-U.)		

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

a.	(Not required for SRO-U.)		
b.	1A-A Diesel Generator idle start for warmup.	D	6
c.	Local emergency boration.	DREA	1

@ 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	