Draft Submittal
(Pink Paper)

1. Written Exam Sample outlines

WATTS BAR EXAM 2002-301

50-390
NOVEMBER 26 &
DECEMBER 9 - 13, 2002

Facility: Watts Bar Date of Exam: 12/09/02 Exam Level:RO

Tier	Group	K/A Category Points											Point Total	
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *		
1. Emergency & Abnormal Plant Evolutions	1	2	2	5				0	4			3	16	16
	2	2	2	2				7	2			2	17	17
	3	1	0	1				1	0			0	3	3
	Tier Totals	5	4	8				8	6			5	36	36
2. Plant Systems	1	3	1	2	4	2	2	2	1	1	1	4	23	23
	2	3	1	4	1	1	1	3	1	2	2	1	20	20
	3	1	1	1	1	1	0	0	1	1	0	1	8	8
	Tier Totals	7	3	7	6	4	3	5	3	4	3	6	51	51
3. Generic Knowledge and Abilities		Cat 1			Cat 2			Cat 3			Cat 4		13	13
		3			3			3			4			

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., 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 exam must total 100 points.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6.* The generic 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1							Form ES-401-4 (R8, S1)
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1			x				05Ak3.02		
000015/17 RCP Malfunctions / 4	x						017AK1.04		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					x		WE10EA2.2		
000024 Emergency Boration / 1		x					024AK2.01		
000026 Loss of Component Cooling Water / 8			x				026AK3.03		
000027 Pressurizer Pressure Control System Malfunction / 3			x				027AK3.03		
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						x	040AG2.4.6		
CE/A11; W/E08 RCS Overcooling - PTS / 4						x	WE08G2.4.18		
000051 Loss of Condenser Vacuum / 4					x		051AA2.02		
000055 Station Blackout / 6			x				055EK3.02		
000057 Loss of Vital AC Elec. Inst. Bus / 6					x		057AA2.18		
000062 Loss of Nuclear Service Water / 4						x	062AG2.4.24		
000067 Plant Fire On-site / 9	x						067AK1.02		
000068 (BW/A06) Control Room Evac. / 8			x				068AK3.18		
000069 (W/E14) Loss of CTMT Integrity / 5		x					069AK2.03		
000074 (W/E06&E07) Inad. Core Cooling / 4					x		074EA2.01		
BW/E03 Inadequate Subcooling Margin / 4									
000076 High Reactor Coolant Activity / 9									
BW/A02&A03 Loss of NNI-X/Y / 7									
K/A Category Totals:	2	2	5	0	4	3	Group Point Total:		16

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2						Form ES-401-4 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1			x				001AK3.01		
000003 Dropped Control Rod / 1									
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1									
BW/A01 Plant Runback / 1									
BW/A04 Turbine Trip / 4									
000008 Pressurizer Vapor Space Accident / 3	x						008AK1.01		
000009 Small Break LOCA / 3					x		009EA2.39		
000011 Large Break LOCA / 3		x		x			011EK2.02 011EA1.04		
W/E04 LOCA Outside Containment / 3									
BW/E08; **W/E03** LOCA Cooldown/Depress. / 4		x					WE03EK2.2		
W/E11 Loss of Emergency Coolant Recirc. / 4				x			WE11EA1.3		
W/EO1 & **E02** Rediagnosis & SI Termination / 3				x			WE02EA1.2		
000022 Loss of Reactor Coolant Makeup / 2						x	022AG2.1.32		
000025 Loss of RHR System / 4					x		025AA2.07		
000029 Anticipated Transient w/o Scram / 1				x			019EA1.13		
000032 Loss of Source Range NI / 7	x						032AK1.01		
000033 Loss of Intermediate Range NI / 7									
000037 Steam Generator Tube Leak / 3			x				037AK3.07		
000038 Steam Generator Tube Rupture / 3									
000054 (CE/E06) Loss of Main Feedwater / 4						x	054AG2.4.48		
BW/E04; **W/E05** Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				x			WE05EA1.3		
000058 Loss of DC Power / 6									
000059 Accidental Liquid RadWaste Rel. / 9				x			059AA1.01		
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7				x			061AA1.01		
W/E16 High Containment Radiation / 9									
CE/E09 Functional Recovery									
K/A Category Point Totals:	2	2	2	7	2	2	Group Point Total:		17

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3						Form ES-401-4 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2									
000036 (BW/A08) Fuel Handling Accident / 8									
000056 Loss of Off-site Power / 6	x						056AK1.01		
000065 Loss of Instrument Air / 8				x			065AA1.01		
BW/E13&E14 EOP Rules and Enclosures									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
CE/A16 Excess RCS Leakage / 2									
W/E13 Steam Generator Over-pressure / 4			x				WE13EK3.2		
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	1	0	1	1	0	0	Group Point Total:		3

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 1											Form ES-401-4 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive	x									x		001K1.05 001A4.03		
003 Reactor Coolant Pump								x				003A2.02		
004 Chemical and Volume Control				x	x							004K4.04 004K5.04		
013 Engineered Safety Features Actuation		x				x						013K2.01 013K6.01		
015 Nuclear Instrumentation				x							x	015K4.06 015G2.2.12		
017 In-core Temperature Monitor			x									017K3.01		
022 Containment Cooling				x							x	022K4.03 022G2.1.10		
025 Ice Condenser									x		x	025A3.02 025G2.1.27		
056 Condensate	x											056K1.03		
059 Main Feedwater				x		x						059K4.11 059K6.09		
061 Auxiliary/Emergency Feedwater					x		x					061A1.04 061K5.01		
068 Liquid Radwaste	x											068K1.07		
071 Waste Gas Disposal			x									071K3.05		
072 Area Radiation Monitoring							x				x	072A1.01 072G2.4.31		
K/A Category Point Totals:	3	1	2	4	2	2	2	1	1	1	4	Group Point Total:		23

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 2											Form ES-401-4 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					x							002K5.10		
006 Emergency Core Cooling	x						x					006K1.07 006A1.11		
010 Pressurizer Pressure Control			x									10K3.01		
011 Pressurizer Level Control									x			011A3.03		
012 Reactor Protection						x						012K6.10		
014 Rod Position Indication										x		014A4.01		
016 Non-nuclear Instrumentation			x									016K3.02		
026 Containment Spray							x					026A1.01		
029 Containment Purge	x											029K1.02		
033 Spent Fuel Pool Cooling														
035 Steam Generator	x											035K1.09		
039 Main and Reheat Steam							x					039A1.03		
055 Condenser Air Removal			x									055K3.01		
062 AC Electrical Distribution									x			062A3.05		
063 DC Electrical Distribution			x									063K3.02		
064 Emergency Diesel Generator		x										064K2.03		
073 Process Radiation Monitoring								x				073A2.01		
075 Circulating Water										x		075A4.01		
079 Station Air				x								079K4.01		
086 Fire Protection											x	086G2.4.25		
K/A Category Point Totals:	3	1	4	1	1	1	3	1	2	2	1	Group Point Total:		20

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 3	Form ES-401-4 (R8, S1)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal					x							005K5.03		
007 Pressurizer Relief/Quench Tank														
008 Component Cooling Water	x											008K1.02		
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
034 Fuel Handling Equipment				x								034K4.01		
041 Steam Dump/Turbine Bypass Control			x									041K3.04		
045 Main Turbine Generator									x			045A3.05		
076 Service Water		x										076K2.08		
078 Instrument Air											x	078G2.4.11		
103 Containment								x				103A2.03		
K/A Category Point Totals:	1	1	1	1	1	0	0	1	1	0	1	Group Point Total:		8

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility: Watts Bar Date of Exam: 12/9-13/02 Exam Level: RO

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	G2.1.2			x
	G2.1.3			x
	G2.1.32			x
				3
Equipment Control	G2.2.12			x
	G2.2.13			x
	G2.2.22			x
				3
Radiation Control	G2.3.1			x
	G2.3.4			x
	G2.3.9			x
				3
Emergency Procedures/ Plan	G2.4.1			x
	G2.4.11			x
	G2.4.16			x
	G2.4.8			x
	Total			4
Tier 3 Point Total				13

Facility: Watts Bar Date of Exam: 12/09/02 Exam Level: SRO

Tier	Group	K/A Category Points											Point Total	
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*		
1. Emergency & Abnormal Plant Evolutions	1	3	4	4				3	7			2	23	24
	2	2	1	2				6	3			3	17	16
	3	1	0	0				0	2			0	3	3
	Tier Totals	6	5	6				9	12			5	43	43
2. Plant Systems	1	3	2	3	1	1	1	2	1	1	1	3	19	19
	2	3	1	1	2	1	1	2	2	2	1	1	17	17
	3	0	1	1	0	1	0	0	0	1	0	0	4	4
	Tier Totals	6	4	5	3	3	2	4	3	4	2	4	40	40
3. Generic Knowledge and Abilities		Cat 1			Cat 2			Cat 3			Cat 4		17	17
		4			5			4			4			

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E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal/1			x				001AK3.01		
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1		x					005AK2.02		s
000011 Large Break LOCA / 3		x		x			011EA1.04 011EK2.02		
W/E04 LOCA Outside Containment / 3					x		WE04EA2.1		s
W/EO1 & **E02** Rediagnosis & SI Termination / 3	x						WE02EK1.2		s
000015/17 RCP Malfunctions / 4	x						017AK1.04		
BW/E09; CE/A13; **W/E09**&E10 Natural Circ. / 4					x		WE10EA2.2		
000024 Emergency Boration / 1		x					024AK2.01		
000026 Loss of Component Cooling Water / 8			x				026AK3.03		
000029 Anticipated Transient w/o Scram / 1				x			029EA1.13		
000040 (BW/E05; CE/E05; **W/E12**) Steam Line Rupture - Excessive Heat Transfer / 4						x	040AG2.4.6		
CE/A11; **W/E08** RCS Overcooling - PTS / 4					x		WE08EA2.1		s
000051 Loss of Condenser Vacuum / 4					x		051AA2.02		s
000055 Station Blackout / 6			x				055EK3.02		
000057 Loss of Vital AC Elec. Inst. Bus / 6					x		057AA2.19		s
000059 Accidental Liquid RadWaste Rel / 9				x			059AA1.01		
000062 Loss of Nuclear Service Water / 4						x	062AG2.4.24		
000067 Plant Fire On-site / 9	x						067AK1.02		
000068 (BW/A06) Control Room Evac. / 8			x				068AK3.18		
000069 (**W/E14**) Loss of CTMT Integrity / 5		x					069AK2.03		
000074 (**W/E06**&E07) Inad. Core Cooling / 4					x		WE06EA2.1		s
000076 High Reactor Coolant Activity / 9					x		076AA2.02		s
K/A Category Totals:	3	4	4	3	7	2	Group Point Total:		24

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2						Form ES-401-3 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Point
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1				x			007EA1.03 CFR43.5		s
000008 Pressurizer Vapor Space Accident / 3	x						008AK1.01		
000009 Small Break LOCA / 3					x		009EA2.34		s
BW/E08; **W/E03** LOCA Cooldown - Depress. / 4		x					WE03EK2.2		
W/E11 Loss of Emergency Coolant Recirc. / 4				x			WE11EA1.3		
000022 Loss of Reactor Coolant Makeup / 2						x	022AG2.1.32		
000025 Loss of RHR System / 4					x		025AA2.07		
000027 Pressurizer Pressure Control System Malfunction / 3			x				027AK3.03		
000032 Loss of Source Range NI / 7	x						032AK1.01		
000033 Loss of Intermediate Range NI / 7									
000037 Steam Generator Tube Leak / 3			x				037AK3.07		
000038 Steam Generator Tube Rupture / 3				x			038EA1.04		s
000054 (CE/E06) Loss of Main Feedwater / 4						x	054AG2.4.48		
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				x			WE05EA1.3		
000058 Loss of DC Power / 6									
000060 Accidental Gaseous Radwaste Rel. / 9					x		060AA2.04 CFR 43.4		s
000061 ARM System Alarms / 7				x			061AA1.01		
W/E16 High Containment Radiation / 9						x	WE16G2.3.10		s
000065 Loss of Instrument Air / 8				x			065AA1.01		
K/A Category Point Totals:	2	1	2	6	3	3	Group Point Total:		16

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3							Form ES-401-3 (R8, S1)	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction /2					x		028AA2.12		s
000036 (BW/A08) Fuel Handling Accident / 8									
000056 Loss of Off-site Power / 6	x						056AK1.01		s
W/E13 Steam Generator Over-pressure / 4					x		WE13EA2.1		s
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	1	0	0	0	2	0	Group Point Total:		3

ES-401	PWR SRO Examination Outline Plant Systems - Tier 2/Group 1											Form ES-401-3 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive	x											001K1.05		
003 Reactor Coolant Pump								X				003A2.02		S
004 Chemical and Volume Control					X							004K5.04		
013 Engineered Safety Features Actuation		X										013K2.01		
014 Rod Position Indication										X		014A4.01		
015 Nuclear Instrumentation				X								015K4.06		
017 In-core Temperature Monitor			X									017K3.01		
022 Containment Cooling											X	022G2.1.10		
025 Ice Condenser									X		X	025A3.02 025G2.1.27		
026 Containment Spray							X					026A1.01		
056 Condensate	X											056K1.03		
059 Main Feedwater						X						059K6.09		
061 Auxiliary/Emergency Feedwater							X					061A1.04		
063 DC Electrical Distribution			X									063K3.02		
064 Emergency Diesel Generator		X										064K2.03		
068 Liquid Radwaste	X											068K1.07		
071 Waste Gas Disposal			X									071K3.05		
072 Area Radiation Monitoring											X	072G2.4.31		
K/A Category Point Totals:	3	2	3	1	1	1	2	1	1	1	3	Group Point Total:		19

ES-401	PWR SRO Examination Outline Plant Systems - Tier 2/Group 2											Form ES-401-3 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					x							002K5.10		
006 Emergency Core Cooling	x						x					006A1.11 006K1.07		
010 Pressurizer Pressure Control			x									010K3.01		
011 Pressurizer Level Control									x			011A3.03		
012 Reactor Protection						x						012K6.10		
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge	x											029K1.02		
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment				x								034K4.01		
035 Steam Generator	x											035K1.09		
039 Main and Reheat Steam							x					039A1.03		
055 Condenser Air Removal												055K3.01		
062 AC Electrical Distribution									x			062A3.05		
064 Emergency Diesel Generator		x										064K2.03		
073 Process Radiation Monitoring								x				073A2.01		s
075 Circulating Water										x		075A4.01		
079 Station Air				x								079K4.01		
086 Fire Protection											x	086G2.4.25		s
103 Containment								x				103A2.03		s
K/A Category Point Totals:	3	1	1	2	1	1	2	2	2	1	1	Group Point Total:		17

ES-401	PWR SRO Examination Outline Plant Systems - Tier 2/Group 3	Form ES-401-3 (R8, S1)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal					x							005K5.03		s
007 Pressurizer Relief/Quench Tank														
041 Steam Dump/Turbine Bypass Control			x									041K3.04		
045 Main Turbine Generator									x			045A3.05		
076 Service Water		x										076K2.08		
K/A Category Point Totals:	0	1	1	0	1	0	0	0	1	0	0	Group Point Total:		4

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility: Summer Date of Exam: 9/16/02 Exam Level: SRO

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	G2.1.2			1
	G2.1.3			1
	G2.1.14	S		1
	G2.1.32			1
	Total			4
Equipment Control	G2.2.8	s		1
	G2.2.12			1
	G2.2.13			1
	G2.2.22	s		1
	G2.2.29			1
	Total			5
Radiation Control	G2.3.1			1
	G2.3.4	s		1
	G2.3.8			1
	G2.3.9			1
	Total			4
Emergency Procedures/ Plan	G2.4.1			1
	G2.4.8			1
	G2.4.11			1
	G2.4.16			1
	Total			4
Tier 3 Point Total (SRO)				17