Final Submittal

WATTS BAR JULY 2004 EXAM
50-390/2004-301
JULY 23, & JULY 26-30,2004

FINAL SAMPLE PLANS / OUTLINES

Facility: Watts Bar FINAL Printed: 07/06/2004

Date Of Exam: 07/23/2004

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

Note:

1. Ensure that at least two topics from every K/A category are sampled within each tier of the **RO** outline (i.e., the 'Tier Totals" in each WA category shall not be less than two). Refer to Section D.1.c for additional guidance regarding the SRO sampling.
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 NWC revisions. The final RO exam must total 75 points and the SWO-only exam must total 25 points.
3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system unless they relate to plantspecific 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 (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, The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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 columns labeled " K and "A". **Use** duplicate pages for RO and SRO-only exams.
8. For Tier **3,** enter the **WA** numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

PWK SRO Examination Outline

Printed: 07/06/2004

Facility: Watts Bar

ES - 401 Emerg ıcy and Abnormal Plant Evolutions - Tier **1 / Group 1** Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization Recovery / 1						X	2.1.34 - Ability to maintain primary and secondary plant chemistry within allowable Limits.	2.9	1
000015 RCP Malfunctions / 4						X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	3.6	1
000038 Steam Gen. Tube Rupture / 3					X		EA2.08 - Viable alternatives for placing plant in safe condition when condenser is not available	4.4	1
000058 Loss of DC Power / *6*					X		AA2.01 - That a loss of dc power has occurred; verification that substitute power sources have come on line	4.1	1
000062 Loss of Nuclear Svc Water / **4**						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
000065 Loss of Instrument **Air** / 8					X		AA2.01 - Cause and effect of low-pressure instrument air alarm	3.2	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.0	1
KIA Category Totals:	0	0	0	0	4	3	**Group Point Total:**		7

PWR SRO Examination Outline

Printed: 07/06/2004

Facility: Watts Bar

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000003 Dropped Control Rod / 1						X	2.2.24 - Ability to analyze the **affect** of maintenance activities on LCO **status.**	3.8	1
000033 Loss of Intermediate Range NI / 7						X	2.1.22 Ability to determine Mode of Operation.	3.3	1
000067 Plant Fire On-site / 9						X	2.4.30 - Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1
000069 Loss of CTMT integrity / 5					X		AA2.01 - Loss of containment integrity	4.3	1
000074 Inad. Core Cooling / 4					X		EA2.01 - Subcooling Margin	4.9	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**2**	**3**	**Group Point Total:**		**5**

PWR SRO Examination Outline

Printed: 07/06/2004

Facility: Watts Ear

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
004 Chemical and Volume Control								X				A2.07 - Isolation of letdown/makeup	3.7	1
061 Auxiliary/Emergency Feedwater								X				A2.05 - Automatic control malfunction	3.4*	1
073 Process Radiation Monitoring											X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
078 Instrument Air											X	2.4.10 - Knowledge of annunciator response procedures.	3.1	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Printed: 07/06/2004

Facility: Watts Bar

ES - 401 **Plant Systems - Tier 2 / Group 2** Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
011 Pressurizer Level Control								X				A2.04 - Loss of one, two or three charging pumps	3.7	1
072 Area Radiation Monitoring											X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.8	1
K/A Category Totals:	0	0	0	0	0	0	0	1	0	0	1	**Group Point Total:**		2

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: 07/06/2004

Facility: Watts Bar

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.13	Knowledge of facility requirements for controlling vital / controlled access.	2.9	1
	2.1.34	Ability **to maintain** primary **and** secondary **plant** chemistry within allowable limits.	2.9	1
		Category Total:		**2**
Equipment Control	2.2.**14**	**Knowledge** of the process for **making configuration** changes.	3.0	1
Radiation Control	2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).	2.9	1
	2.3.8	Knowledge of the process for performing a planned gaseous radioactive release.	3.2	1
		Category Total:		**2**
Emergency Procedures/Plan	**2.4.41**	Knowledge of the emergency action level thresholds and classifications.	4.1	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	3.6	1
		Category Total:		**2**
		Generic Total:		**7**

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Bate ***Of*** Exam: *09/23/2020*

Tier	Group	RO K/A Category Points												SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	K	A	A2	G*	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3				3	3			3	18	0	0	0	0	0
	2	2	1	2				1	1			2	9	0	0	0	0	0
	Tier Totals	5	4	5				4	4			5	27	0	0	0	0	0
2. Plant Systems	1	2	2	3	2	3	3	2	3	2	3	3	28	0	0	0	0	0
	2	1	1	1	1	1	1	1	1	1	1	0	10	0	0	0	0	0
	Tier Totals	3	3	4	3	4	4	3	4	3	4	3	38	0	0	0	0	0
3. Generic Knowledge And Abilities Categories		1			2			3			4		10	1	2	3	4	0
		3			2			3			2			0	0	0	0	

Note:

1. Ensure that at least two topics from every WA category are sampled within each tier of the RO outline (i.e., the 'Tier Totals" in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding the SRO sampling.
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. Select topics from many systems and evolutions; avoid selecting more than two 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 (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. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.
7. On the following pages, enter the WA numbers, **a** brief description of each topic, the topics' importance ratings (IR) 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 columns labeled "K" and "A". **Use** duplicate pages for RO and SRO-only exams.
8. For Tier 3, enter the WA numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

PWR KO Examination Outline

Printed: 06/25/2004

Facility: Watts Bar

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000008 Pressurizer Vapor Space Accident / 3			X				AK3.03 - Actions contained in EOP for PZR vapor space accident/LOCA	4.1	1
000009 Small Break LOCA / 3	X						EK1.01 - Natural circulation and cooling, including reflux boiling	4.2	1
000011 Large Break LOCA / 3		X					EK2.02 - Pumps	2.6*	1
000017 RCP Malfunctions / 4				X			AA1.03 - Reactor trip alarms, switches, and indicators	3.7*	1
000022 Loss of Rx Coolant Makeup / 2						X	2.4.35 - Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.3	1
000025 Loss of RHR System / 4						X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
000026 Loss of Component Cooling Water / 8				X			AA1.06 - Control of flow rates to components cooled by the CCWS	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 - Controllers and positioners	2.6	1
000029 ATWS / 1		X					EK2.06 - Breakers, relays, and disconnects	2.9*	1
000038 Steam Gen. Tube **Rupture** / 3			X				EK3.01 - **Equalizing** pressure on primary **and** secondary sides of ruptured S/G	4.1	1
000054 Loss of Main Feedwater / 4				X			AA1.02 - Manual startup of electric and steam-driven AFW pumps	4.4	1
000055 Station Blackout / 6	X						EK1.02 - Natural circulation cooling	4.1	1
000056 Loss of Off-site Power / 6					X		AA2.18 - Reactor coolant temperature, pressure, and PZR level recorders	3.8	1
000057 Loss of Vital AC Inst. Bus / 6			X				AK3.01 - Actions contained in EOP for loss of vital ac electrical instrument bus	4.1	1
000062 Loss of Nuclear Svc Water / 4					X		AA2.03 - The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition	2.6	1
W/E04 LOCA Outside Containment / 3					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.6	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	X						EK1.1 - Components, capacity, and function of emergency systems	3.8	1

PWR RO Examination Outline

Printed: 06/25/2004

Facility: Watts Bar

ES - 401 Emergency **and** Abnormal Plant Evolutions **- Tier 1 / Group 1** Form **ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
W/E11 Loss of Emergency Coolant Recirc. / 4						X	2.4.21 - Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions: 5. Radioactivity release control.	3.7	1
K/A Category Totals:	3	3	3	3	3	3	**Group Point Total:**		18

PWR RO Examination Outline

Printed: 06/25/2004

Facility: Watts Bar

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1	X						AK1.03 - Xenon 'ransien'	3.2	1
000024 Emergency Boration / 1		X					AK2.01 -Valves	2.4	1
000037 Steam Generator Tube Leak / 3			X				AK3.06 - Normal operating precautions to preclude or minimize SGTR	3.6	1
000051 Loss of Condenser Vacuum / **4**					X		AA2.02 - Conditions requiring reactor and/or turbine trip	3.9	1
000061 ARM System Alarms / 7						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
W/E01 Rediagnosis / 3				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.7	1
W/E02 SI lerniinationi 3	X						EK1.1 - Components. capacity, **and** function of emergency systems	3.2	1
W/E08 RCS Overcooling - PTS / 4						X	2.4.2 - Knowledge of system set points, interlocks and automatic. actions associated with EOP entry conditions. Note: The issue of setpoints and automatic safety features **is** nut specifically covered in the systems sections.	**3.9**	1
W/E15 Containment Flooding / **5**			X				**EK3.3 -** Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	2.9	1
K/A Category Totals:	**2**	**1**	**2**	**1**	**1**	**2**	**Group Point Total:**		**9**

PWR RO Examination Outline

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Facility: Watts Bar

ES - 401 Plant **ystems -Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
003 Reactor Coolant Pump			X									K3.03 - Feedwater and emergency feedwater	2.8	1
004 Chemical and Volume Control						X						K6.07 - Heat exchangers and condensers	2.7	1
005 Residual Heat Removal						X						K6.03 - RHR heat exchanger	2.5	1
006 Emergency Core Cooling					X							K5.09 - Thermodynamics of water and steam. including subcooled margin, superheat, and saturation	3.3	1
007 Pressurizer Relief/Quench Tank					X							K5.02 - Method of forming a steam bubble in the PZR	3.1	1
008 Component Cooling Water	X											K1.04 - RCS, in order to determine source(s) of RCS leakage into the CCWS	3.3	1
008 Component Cooling Water											X	2.4.18 - Knowledge of the specific buses for EOPs.	2.7	1
010 Pressurizer Pressure Control					X							K5.01 - Determination of condition of fluid in PZR, using steam tables	3.5	1
012 Reactor f'rotection				X								K4.09 - Separation of control and protection circuits	2.8	1
013 Engineered Safety Features Actuation			X									**K3.02 -** RCS	4.3	1
013 Engineered Safety Features Actuation										X		A4.01 - ESFAS-initiated equipment which fails to actuate	4.5	1
022 Containment Cooling								X				A2.03 - Fan motor thermal overload/high-speed operation	2.6	1
025 **Ice** Condenser						X						K6.01 - Upper and lower doors of the ice condenser	3.4*	1
025 Ice Condenser											X	2.1.9 - Ability to direct personnel activities inside the control room.	2.5	1
026 Containment Spray			X									K3.02 -Recirculation spray system	4 ?*	1
039 Main and Reheat Steam				X								K4.06 - Prevent reverse steam flow on steam line break	3.3	1
056 Condensate								X				A2.04 - Loss of condensate pumps	2.6	1
059 Main Feedwater									X			A3.02 - Programmed levels of the S/G	2.9	1
061 Auxiliary/Emergency Feedwater		X										K2.02 - **AFW** electric driven pumps	3.7*	1
062 AC Electrical Distribution		X										K2.01 - Major system loads	3.3	1

PWR RO Examination Outline

Facility: Watts Bar

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ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
062 AC Electrical Distribution											X	2.1.2 - Knowledge of operator responsibilities during all modes of plant operation.	3.0	1
063 DC Electrical Distribution										X		A4.01 - Major breakers and control power fuses	2.8*	1
064 Emergency Diesel Generator							X					A1.04 - Crankcase temperature and pressure	2.8	1
073 Process Radiation Monitoring								X				A2.01 - Erratic or failed power supply	2.5	1
076 Service Water							X					A1.02 - Reactor and turbine building closed cooling water temperatures	2.6*	1
078 Instrument Air									X			A3.01 - Air pressure	3.1	1
103 Containment	X											K1.05 - Personnel access hatch and emergency **access** hatch	2.8*	1
103 Containment										X		**A4.06** - Operation of the containment personnel airlock door	2.7*	1
K/A Category Totals:	2	2	3	2	3	3	2	3	2	3	3	**Group** Point Total:		28

PWR RO Examination Outline

Facility: Watts Bar

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ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001 Control Rod Drive		X										K2.01 - One-line diagram of power supply to M/G sets	3.5	1
002 Reactor Coolant							X					A1.09 - RCS T-ave	3.7	1
014 Rod Position Indication										X		A4.01 - Rod selection control	3.3	1
016 Non-nuclear Instrumentation					X							K5.01 - Separation of control and protection circuits	2.7*	1
028 Hydrogen Recombiner and Purge Control			X									K3.01 - Hydrogen concentration in containment	3.3	1
029 Containment Purge									X			A3.01 - CPS isolation	3.8	1
035 Steam Generator				X								K4.05 - Amount of reserve water in S/G	2.9	1
068 Liquid Radwaste	X											K1.07 - Sources of liquid wastes for LRS	2.7	1
079 Station Air								X				A2.01 - Cross-connection with IAS	2.9	1
086 Fire Protection						X						K6.04 - Fire, smoke, and heat detectors	2.6	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**Group Point Total:**		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Printed: 06/25/2004

Facility: Watts Bar

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0	1
	2.1.25	Ability to obtain and interpret station reference materials such as graphs. monographs, and tables which contain performance data.	2.8	1
	2.1.27	Knowledge **of** system purpose and or function.	2.8	1
		Category Total:		**3**
Equipment Control	2.2.22	Knowledge of limiting conditions for operations and safety limits.	3.4	1
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	1
		Category Total:		**2**
Radiation Control	**2.3.9**	Knowledge ofthe process for performing a containment purge.	2.5	1
	2.3.10	Ability to perform procedures to reduce excessive levels ***of*** radiation arid guard against personnel exposure.	2.9	1
	2.3.11	Ability to control radiation releases.	2.7	1
		Category Total:		**3**
Emergency Procedures/Plan	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.	3.4	1
	2.4.17	Knowledge of EOP terms and definitions.	3.1	1
		Category Total:		**2**
		Generic Total:		**10**

Tier / Group	Randomly Selected K/A	Reason for Rejection
Tier 1 Gp 2	003 G 2.2.24	No relationship between the APE (003) and the Generic K/A. R. Aiello concurred.
		Used blind **draw to select new Generic K/A. G 2.1.14**
Tier 1 Gp 2	059 AA2.03	Repetitive of other K/As selected for this examination. R. Aiello concurrred.
		Used double blind draw to select new APE and Generic K/A. 067 G 2.4.30
Tier 2 Gp 1	078 G 2.4.10	Repetitive of other K/As selected for this examination. R. Aiello concurred.
		Used double blind draw to select new System and Generic K/A. 078 G 2.2.22
Tier 1 Gp 1	062 AA2.02	Repetitive of other K/As selected for this examination. R. Aiello concurred.
		Ron Aiello provided alternate K/A. G 2.4.4.
Tier 2 Gp 1	063 A4.03	Had difficulty writing question to this K/A. Ron Aiello allowed random selection
		of new K/A. Generator selected 013 A4.01.
T2/G1	025 G 2.1.9	RFA SELECTED KA 2.1.7 (SYS 025)