Facility: Waterford 3 Date of Exam: 11/12/2004

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	K	A	A 2	G *	TOTAL
1. Emergency & Abnormal Plant Evolutions	1	3	3	3				3	3			3	18	0	0	0	0	0
	2	1	2	2				1	2			1	9	0	0	0	0	0
	Tier Totals	4	5	5				4	5			4	27	0	0	0	0	0
2. Plant Systems	1	3	2	3	2	2	2	3	4	2	3	2	28	0	0	0	0	0
	2	1	1	1	2	0	1	1	1	0	1	1	10	0	0	0	0	0
	Tier Totals	4	3	4	4	2	3	4	5	2	4	3	38	0	0	0	0	0
3. Generic Knowledge and Abilities		1			2			3			4		10	1	2	3	4	0
		2			3			2			3			0	0	0	0	

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 K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding 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 or evolution 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 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 table above; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams.
8. For Tier 3, enter the K/A number, 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.

ES-401	PWR Examination Outline	Form ES-401-2
	Emergency and Abnormal Plant Evolutions – Tier1 / Group 1 (RO)	

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
00007 (BW/E02 & E10; CE/E02) Reactor Trip – Stabilization – Recovery / 1		X					EK2.03 - Knowledge of the interrelations between a reactor trip and the following: Reactor trip status panel. (CFR: 41.7, 41.6)	3.5	1
00008 Pressurizer Vapor Space Accident / 3					X		AA2.23 - Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Criteria for throttling high-pressure injection after a small LOCA (CFR: 41.8, 41.10 / 43.5)	3.6	1
000009 Small Break LOCA / 3		X					EK2.03 - Knowledge of the interrelations between the small break LOCA and the following: S/Gs. (CFR: 41.7)	3.0	1
000011 Large Break LOCA / 3	X						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: Natural circulation and cooling, including reflux boiling. (CFR: 41.8, 41.14)	4.1	1
000015/17 RCP Malfunctions / 4			X				AK3.07 - Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Ensuring that S/G levels are controlled properly for natural circulation enhancement. (CFR: 41.5, 41.10, 41.14)	4.1	1
000022 Loss of Rx Coolant Makeup / 2			X				AK3.02 - Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Pump Makeup: Actions contained in SOPs and EOPs for RCPs, loss of makeup, loss of charging, and abnormal charging. (CFR: 41.5, 41.10)	3.5	1
000025 Loss of RHR System / 4		X					AK2.02 - Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: LPI or Decay Heat Removal/RHR pumps. (CFR: 41.7)	3.2*	1
000026 Loss of Component Cooling Water / 8						X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.5, 41.10/ 43.5,)	3.4	1
000027 Pressurizer Pressure Control System Malfunction / 3	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Latent heat of vaporization/ condensation. (CFR: 41.8 / 41.14)	2.6	1
000029 ATWS / 1				X			EA1.15 - Ability to operate and monitor the following as they apply to a ATWS: AFW System. (CFR: 41.7)	4.1	1
000038 Steam Gen. Tube Rupture / 3						X	2.2.23 - Ability to track limiting conditions for operations. (CFR: 41.5/ 43.2)	2.6	1

Emergency and Abnormal Plant Evolutions – Tier1 / Group 1 (RO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	2.4.3 - Ability to identify post-accident instrumentation. (CFR: 41.7)	3.5	1
000054 (CE/E06) Loss of Main Feedwater / 4					X		AA2.08 - Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Steam flow -feed trend recorder (CFR: 41.5/ 43.5)	2.9	1
000055 Station Blackout / 6			X				EK3.02 - Knowledge of the reasons for the following responses as the apply to the Station Blackout: Actions contained in EOP for loss of offsite and onsite power. (CFR: 41.5, 41.10)	4.3	1
000056 Loss of Off -site Power / 6	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of subcooling, use of steam tables to determine it. (CFR: 41.10, 41.14)	3.1*	1
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.20 - Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: Interlocks in effect on loss of ac vital electrical instrument bus that must be bypassed to restore normal equipment operation. (CFR: 41.7/ 43.5)	3.6	1
000058 Loss of DC Power / 6							Reselected see justifications		0
000062 Loss of Nuclear Svc Water / 4				X			AA1.01 – Ability to operate and/or monitor the following as they apply to the loss of nuclear service water (SWS): Nuclear Service Water temperature indications (CFR: 41.7)	3.1	1
000065 Loss of Instrument Air / 8				X			AA1.02 - Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Components served by instrument air to minimize drain on system (CFR: 41.7)	2.6	1
W/E04 LOCA Outside Containment / 3							Not Applicable to Waterford 3		0
W/E11 Loss of Emergency Coolant Recirc. / 4							Not Applicable to Waterford 3		0
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4							Not Applicable to Waterford 3		0
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:		18

Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2 (RO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1							Not Selected		0
000003 Dropped Control Rod / 1							Not Selected		0
000005 Inoperable/Stuck Control Rod / 1					X		AA2.01 - Ability to determine and interpret the following as they apply to the Inoperable / Stuck Control Rod: Stuck or inoperable rod from in-core and ex-core NIS, in-core or loop temperature measurements. (CFR: 41.5, 41.6 / 43.5)	3.3	1
000024 Emergency Boration / 1							Not Selected		0
000028 Pressurizer Level Malfunction / 2							Not Selected		0
000032 Loss of Source Range NI / 7							Not Selected		0
000033 Loss of Intermediate Range NI / 7							Not Selected		0
000036 (BW/A08) Fuel Handling Accident / 8		X					AK2.02 - Knowledge of the interrelations between the Fuel Handling Incidents and the following: Radiation monitoring equipment (portable and installed). (CFR: 41.7, 41.11, 41.13)	3.4	1
000037 Steam Generator Tube Leak / 3			X				AK3.06 - Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Leak: Normal operating precautions to preclude or minimize SGTR. (CFR 41.5,41.10)	3.6	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip. (CFR: 41.5, 41.10 / 43.5)	3.9	1
000059 Accidental Liquid RadWaste Rel. / 9							Not Selected		0
000060 Accidental Gaseous Radwaste Rel. / 9				X			AA1.02- Ability to operate and / or monitor the following as they apply to the Accidental Gaseous Radwaste: Ventilation System (CFR: 41.7, 41.13)	2.9	1
000061 ARM System Alarms / 7	X						AK1.01 - Knowledge of the operational implications of the following concepts as they apply to Area Radiation Monitoring (ARM) System Alarms: Detector limitations. (CFR: 41.10, 41.11, 41.12)	2.5*	1
000067 Plant Fire On-site / 8							Not Selected		0
000068 (BW/A06) Control Room Evac. / 8			X				AK3.12 - Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Required sequence of actions for emergency evacuation of control room (CFR: 41.5, 41.10)	4.1	1
000069 (W/E14) Loss of CTMT Integrity / 5							Not Selected		0
000074 Inadequate Core Cooling/ 4						X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10, 43.5)	3.4	1
000076 High Reactor Coolant Activity / 9							Not Selected		0
W/EO1 & E02 Rediagnosis & SI Termination / 3							Not Applicable to Waterford 3		0

Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2 (RO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
W/E13 Steam Generator Over-pressure / 4							Not Applicable to Waterford 3		0
W/E15 Containment Flooding / 5							Not Applicable to Waterford 3		0
W/E16 High Containment Radiation / 9							Not Applicable to Waterford 3		0
BW/A01 Plant Runback / 1							Not Applicable to Waterford 3		0
BW/A02&A03 Loss of NNI-X/Y / 7							Not Applicable to Waterford 3		0
BW/A04 Turbine Trip / 4							Not Applicable to Waterford 3		0
BW/A05 Emergency Diesel Actuation / 6							Not Applicable to Waterford 3		0
BW/A07 Flooding / 8							Not Applicable to Waterford 3		0
BW/E03 Inadequate Subcooling Margin / 4							Not Applicable to Waterford 3		0
BW/E08; W/E03 LOCA Cooldown-Depress. / 4							Not Applicable to Waterford 3		0
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							Not Selected		0
BW/E13&E14 EOP Rules and Enclosures							Not Applicable to Waterford 3		0
CE/A11; W/E08 RCS Overcooling - PTS / 4							Not Selected		0
CE/A16 Excess RCS Leakage / 2							Not Selected		0
CE/E09 Functional Recovery		X					EK2.1 - Knowledge of the interrelations between the (Functional Recovery) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. (CFR: 41.7)	3.6	1
K/A Category Totals:	1	2	2	1	2	1	Group Point Total:		9

ES-401	PWR Examination Outline											Form ES-401-2		
Plant systems – Tier 2 / Group 1 (RO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump						X						K6.02 - Knowledge of the effect of a loss or malfunction on the following will have on the RCPS: RCP seals and seal water supply (CFR: 41.3, 41.7)	2.7	1
004 Chemical and Volume Control	X											K1.22 - Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: BWST (CFR: 41.7, 41.8)	3.4	1
005 Residual Heat Removal						X						K6.03 - Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger (CFR: 41.5 / 41.7)	2.5	1
006 Emergency Core Cooling	X											K1.03 -Knowledge of the physical connections and/or cause effect relationships between the ECCS and the following systems: RCS (CFR: 41.7)	4.2	1
007 Pressurizer Relief/ Quench Tank							X					A1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Monitoring quench tank temperature (CFR: 41.5)	2.6	1
007 Pressurizer Relief/ Quench Tank										X		A4.04 - Ability to manually operate and/or monitor in the control room: PZR vent valve (CFR: 41.7)	2.6*	1
008 Component Cooling Water							X					A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW flow rate (CFR: 41.5)	2.8	1
010 Pressurizer Pressure Control			X									K3.02 - Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: RPS (CFR: 41.7)	4.0	1
012 Reactor Protection			X									K3.02 - Knowledge of the effect that a loss or malfunction of the RPS will have on the following: T/G (CFR: 41.7)	3.2*	1

Plant systems – Tier 2 / Group 1 (RO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
013 Engineered Safety Features Actuation								X				A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations : Excess steam demand (CFR: 41.5, 41.10 / / 43.5)	4.3	1
013 Engineered Safety Features Actuation					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to the ESFAS: Safety system logic and reliability (CFR: 41.5, 41.7)	2.9	1
022 Containment Cooling							X					A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment pressure (CFR: 41.5, 41.9)	3.6	1
022 Containment Cooling										X		A4.01 - Ability to manually operate and/or monitor in the control room: CCS fans. (CFR: 41.7)	3.6	1
025 Ice Condenser												Not Applicable to Waterford 3		0
026 Containment Spray		X										K2.01 - Knowledge of bus power supplies to the following: Containment spray pumps (CFR: 41.7)	3.4*	1
039 Main and Reheat Steam			X									K3.05 - Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: RCS (CFR: 41.4, 41.7)	3.6	1
056 Condensate								X				A2.04 - Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps (CFR: 41.5, 41.10 / 43.5)	2.6	1
059 Main Feedwater				X								K4.19 - Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater isolation of MFW (CFR: 41.7)	3.2	1
059 Main Feedwater										X		A4.08 - Ability to manually operate and monitor in the control room: Feed regulating valve controller (CFR: 41.7 41.5)	3.0*	1

Plant systems – Tier 2 / Group 1 (RO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
061 Auxiliary/Emergency Feedwater				X								K4.03 - Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Automatic blowdown/sample isolation (CFR: 41.7)	2.7	1
061 Auxiliary/Emergency Feedwater											X	2.4.6 - Knowledge of symptom based EOP mitigation strategies. (CFR: 41.10 / 43.5)	3.1	1
062 AC Electrical Distribution								X				A2.15 - Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequence of paralleling out-of-phase/mismatch in volts (CFR: 41.5, 41.10 / 43.5)	2.8	1
063 DC Electrical Distribution									X			A3.01 - Ability to monitor automatic operation of the DC electrical system, including: Meters, annunciators, dials, recorders, and indicating lights (CFR: 41.5, 41.7)	2.7	1
064 Emergency Diesel Generator		X										K2.02 - Knowledge of bus power supplies to the following: Fuel oil pumps (CFR: 41.7)	2.8*	1
073 Process Radiation Monitoring					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to the PRM system: Radiation theory, including sources, types, units, and effects (CFR: 41.5, 41.11)	2.5	1
076 Service Water								X				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: Service water header pressure (CFR: 41.5, 41.10 / 43.5)	2.7	1
078 Instrument Air	X											K1.04 - Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor. (CFR: 41.4)	2.6	1
103 Containment									X			A3.01 - Ability to monitor automatic operation of the containment system, including: Containment isolation (CFR: 41.7, 41.9)	3.9	1

ES-401	PWR Examination Outline											Form ES-401-2	
Plant systems – Tier 2 / Group 1 (RO)													
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
103 Containment											X	2.4.24 - Knowledge of loss of cooling water procedures. (CFR: 41.10)	3.3	1
K/A Category Totals:	3	2	3	2	2	2	3	4	2	3	2	Group Point Total:		28

ES-401	PWR Examination Outline											Form ES-401-2		
Plant systems – Tier 2 / Group 2 (RO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive		X										K2.05 - Knowledge of bus power supplies to the following: M/G sets (CFR: 41.7)	3.1*	1
002 Reactor Coolant											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5, 43.2)	3.4	1
011 Pressurizer Level Control										X		A4.04 - Ability to manually operate and/or monitor in the control room: Transfer of PZR LCS from automatic to manual control. (CFR: 41.7)	3.2	1
014 Rod Position Indication	X											K1.01 - Knowledge of the physical connections and/or cause effect relationships between the RPIS and the following systems: CRDS (CFR: 41.6)	3.2*	1
015 Nuclear Instrumentation			X									K3.06 - Knowledge of the effect that a loss or malfunction of the NIS will have on the following: Reactor regulating system (CFR: 41.5, 41.7)	2.9*	1
016 Non-nuclear Instrumentation												Not Selected		0
017 In-core Temperature Monitor												Not Selected		0
027 Containment Iodine Removal								X				A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the CIRS; and (b) based on those predictions, use Procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High temperature in the filter system (CFR: 41.5, 41.10, 41.13 / 43.5)	3.0*	1
028 Hydrogen Recombiner and Purge Control												Not Selected		0
029 Containment Purge												Not Selected		0
033 Spent Fuel Pool Cooling												Not Selected		0
034 Fuel Handling Equipment												Not Selected		0
035 Steam Generator												Not Selected		0
041 Steam Dump/Turbine Bypass Control												Not Selected		0
045 Main Turbine Generator												Not Selected		0
055 Condenser Air Removal												Not Selected		0
068 Liquid Radwaste						X						K6.10 - Knowledge of the effect of a loss or malfunction on the following will have on the Liquid Radwaste System : Radiation monitors (CFR: 41.7, 41.11)	2.5	1

ES-401	PWR Examination Outline											Form ES-401-2	
Plant systems – Tier 2 / Group 2 (RO)													
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
071 Waste Gas Disposal							X					A1.06 - Ability to predict and/or monitor changes in parameters(to prevent exceeding design limits) associated with Waste Gas Disposal System operating the controls including: Ventilation system (CFR: 41.5,41.13)	2.5	1
072 Area Radiation Monitoring				X								K4.02 - Knowledge of ARM system design feature(s) and/or interlock(s) which provide for the following: Fuel building isolation (CFR: 41.7, 41.13)	3.2*	1
075 Circulating Water												Not Selected		0
079 Station Air				X								K4.01 - Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following: Cross-connect with IAS (CFR: 41.7)	2.9	1
086 Fire Protection												Not Selected		0
K/A Category Totals:	1	1	1	2	0	1	1	1	0	1	1	Group Point Total:		10

ES-401	Generic Knowledge and Abilities Outline (Tier 3)	Form ES-401-3
Facility Waterford 3	Date of Exam: 11/12/2004	

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements. (CFR: 41.10)	3.7	1		
	2.1.16	Ability to operate plant phone, paging system, and two-way radio. (CFR: 41.10)	2.9	1		
	Subtotal			2		
2. Equipment Control	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. (CFR: 41.1, 41.10)	3.7	1		
	2.2.11	Knowledge of the process for controlling temporary changes. (CFR: 41.10 / 43.3)	2.5	1		
	2.2.33	Knowledge of control rod programming. (CFR: 41.6)	2.5	1		
	Subtotal			3		
3. Radiation Control	2.3.9	Knowledge of the process for performing a containment purge. (CFR: 41.13 / 43.4)	2.5	1		
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. (CFR: 41.10, 41.12 / 43.4)	2.9	1		
	Subtotal			2		
4. Emergency Procedures/ Plan	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. (CFR: 41.7, 41.10) Note: The issue of setpoints and automatic safety features is not specifically covered in the systems sections).	3.9	1		
	2.4.8	Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-based EOPs. (CFR: 41.10 / 43.5)	3.0	1		
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2)	4.0	1		
	Subtotal			3		
Tier 3 Point Total				10		7

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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*	TOTAL
1. Emergency & Abnormal Plant Evolutions	1	0	0	0				0	0			0	0	0	0	5	2	7
	2	0	0	0				0	0			0	0	0	0	3	2	5
	Tier Totals	0	0	0				0	0			0	0	0	0	8	4	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		1		2		3		4					0	1	2	3	4	7
		0		0		0		0						2	2	1	2	

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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 table above; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams.
8. For Tier 3, enter the K/A number, 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.

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

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
00007 (BW/E02 & E10; CE/E02) Reactor Trip – Stabilization – Recovery / 1					X		EA2.2 - Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery): Adherence to appropriate procedures and operation within the limitations in the facility*s license and amendments. (CFR: 43.1, 43.5)	4.0	1
00008 Pressurizer Vapor Space Accident / 3							Not Selected		0
000009 Small Break LOCA / 3							Not Selected		0
000011 Large Break LOCA / 3							Not Selected		0
000015/17 RCP Malfunctions / 4							Not Selected		0
000022 Loss of Rx Coolant Makeup / 2							Not Selected		0
000025 Loss of RHR System / 4							Not Selected		0
000026 Loss of Component Cooling Water / 8							Not Selected		0
000027 Pressurizer Pressure Control System Malfunction / 3							Not Selected		0
000029 ATWS / 1							Not Selected		0
000038 Steam Gen. Tube Rupture / 3					X		EA2.15 - Ability to determine or interpret the following as they apply to a SGTR: Pressure at which to maintain RCS during S/G cooldown. (CFR: 43.5)	4.4	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	2.1.12 - Ability to apply technical specifications for a system. (CFR: 43.2)	4.0	1
000054 (CE/E06) Loss of Main Feedwater / 4					X		EA2.1 - Ability to determine and interpret the following as they apply to the (Loss of Feedwater): Facility conditions and selection of appropriate procedures during abnormal and emergency operations. (CFR: 43.5)	3.9	1
000055 Station Blackout / 6							Not Selected		0
000056 Loss of Off-site Power / 6						X	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (CFR: 43.2)	3.7	1
000057 Loss of Vital AC Inst. Bus / 6							Not Selected		0
000058 Loss of DC Power / 6							Not Selected		0
000062 Loss of Nuclear Svc Water / 4					X		AA2.01 - Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: Location of a leak in the SWS (CFR: 43.5)	3.5	1
000065 Loss of Instrument Air / 8					X		AA2.05 -Ability to determine and interpret the following as they apply to the Loss of Instrument Air: When to commence plant shutdown if instrument air pressure is decreasing (CFR: 43.5)	4.1	1
W/E04 LOCA Outside Containment / 3							Not Applicable to Waterford 3		0

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1 / Group 1 (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	#
W/E11 Loss of Emergency Coolant Recirc. / 4							Not Applicable to Waterford 3		0
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4							Not Applicable to Waterford 3		0
K/A Category Totals:	0	0	0	0	5	2	Group Point Total:		7

ES-401	PWR Examination Outline							Form ES-401-2	
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1					X		AA2.03 - Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Proper actions to be taken if automatic safety functions have not taken place (CFR: 43.5)	4.8	1
000003 Dropped Control Rod / 1							Not Selected		0
000005 Inoperable/Stuck Control Rod / 1							Not Selected		0
000024 Emergency Boration / 1							Not Selected		0
000028 Pressurizer Level Malfunction / 2					X		AA2.02 - Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: PZR level as a function of power level or T-ave, including interpretation of malfunction. (CFR: 43.5)	3.8	1
000032 Loss of Source Range NI / 7						X	2.4.48 - Ability to interpret c ontrol room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions. (CFR: 43.5)	3.8	1
000033 Loss of Intermediate Range NI / 7							Not Selected		0
000036 (BW/A08) Fuel Handling Accident / 8							Not Selected		0
000037 Steam Generator Tube Leak / 3							Not Selected		0
000051 Loss of Condenser Vacuum / 4							Not Selected		0
000059 Accidental Liquid RadWaste Rel. / 9							Reselected see justifications		0
000060 Accidental Gaseous Radwaste Rel. / 9							Not Selected		0
000061 ARM System Alarms / 7							Not Selected		0
000067 Plant Fire On-site / 8							Not Selected		0
000068 (BW/A06) Control Room Evac. / 8							Not Selected		0
000069 (W/E14) Loss of CTMT Integrity / 5					X		AA2.01 – Ability to determine and interpret the following as they apply to the loss of containment integrity: Loss of containment integrity. (CFR: 43.50	4.3	1
000074 Inadequate Core Cooling/ 4							Not Selected		0
000076 High Reactor Coolant Activity / 9							Not Selected		0
W/EO1 & E02 Rediagnosis & SI Termination / 3							Not Applicable to Waterford 3		0
W/E13 Steam Generator Over-pressure / 4							Not Applicable to Waterford 3		0
W/E15 Containment Flooding / 5							Not Applicable to Waterford 3		0
W/E16 High Containment Radiation / 9							Not Applicable to Waterford 3		0
BW/A01 Plant Runback / 1							Not Applicable to Waterford 3		0
BW/A02&A03 Loss of NNI-X/Y / 7							Not Applicable to Waterford 3		0
BW/A04 Turbine Trip / 4							Not Applicable to Waterford 3		0
BW/A05 Emergency Diesel Actuation / 6							Not Applicable to Waterford 3		0

ES-401	PWR Examination Outline							Form ES-401-2	
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
BW/A07 Flooding / 8							Not Applicable to Waterford 3		0
BW/E03 Inadequate Subcooling Margin / 4							Not Applicable to Waterford 3		0
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Not Applicable to Waterford 3		0
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							Not Selected		0
BW/E13&E14 EOP Rules and Enclosures							Not Applicable to Waterford 3		0
CE/A11; W/E08 RCS Overcooling - PTS / 4						X	2.2.23 - Ability to track limiting conditions for operations. (CFR: 43.2)	3.8	1
CE/A16 Excess RCS Leakage / 2							Not Selected		0
CE/E09 Functional Recovery							Not Selected		0
BW/E03 Inadequate Subcooling Margin / 4	0	0	0	0	3	2	Group Point Total:		5

ES-401	PWR Examination Outline											Form ES-401-2		
Plant systems – Tier 2 / Group 1 (SRO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump												Not Selected		0
004 Chemical and Volume Control								X				A2.22 - Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Mismatch of letdown and charging flows (CFR: 43.5)	3.1	1
005 Residual Heat Removal												Not Selected		0
006 Emergency Core Cooling								X				A2.13 – Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and based on those predictions use procedures to correct, control , or mitigate the consequences of those malfunctions or operations: Inadvertent SIS actuation	4.2	1
007 Pressurizer Relief/ Quench Tank												Not Selected		0
008 Component Cooling Water												Not Selected		0
010 Pressurizer Pressure Control												Not Selected		0
012 Reactor Protection											X	2.1.32 - Ability to explain and apply all system limits and precautions. (CFR: 43.2)	3.8	1
013 Engineered Safety Features Actuation												Not Selected		0
022 Containment Cooling												Not Selected		0
025 Ice Condenser												Not Applicable to Waterford 3		0
026 Containment Spray												Not Selected		0
039 Main and Reheat Steam												Not Selected		0
056 Condensate												Not Selected		0
059 Main Feedwater												Not Selected		0
061 Auxiliary/Emergency Feedwater												Not Selected		0
062 AC Electrical Distribution											X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (CFR: 43.5)	4.4	1
063 DC Electrical Distribution												Reselected see justifications		0
064 Emergency Diesel Generator												Not Selected		0
073 Process Radiation Monitoring												Not Selected		0
076 Service Water												Not Selected		0
078 Instrument Air												Not Selected		0

ES-401	PWR Examination Outline											Form ES-401-2	
Plant systems – Tier 2 / Group 1 (SRO)													
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
103 Containment												Not Selected		0
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	2	Group Point Total:		4

ES-401	PWR Examination Outline												Form ES-401-2	
Plant systems – Tier 2 / Group 2 (SRO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive												Not Selected		0
002 Reactor Coolant												Not Selected		0
011 Pressurizer Level Control												Not Selected		0
014 Rod Position Indication												Not Selected		0
015 Nuclear Instrumentation												Not Selected		0
016 Non-nuclear Instrumentation												Not Selected		0
017 In-core Temperature Monitor												Not Selected		0
027 Containment Iodine Removal												Not Selected		0
028 Hydrogen Recombiner and Purge Control												Not Selected		0
029 Containment Purge								X				A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Continuance of outdoor temperature inversion. (CFR: 43.4, 43.5)	2.9	1
033 Spent Fuel Pool Cooling												Not Selected		0
034 Fuel Handling Equipment												Not Selected		0
035 Steam Generator												Not Selected		0
041 Steam Dump/Turbine Bypass Control												Not Selected		0
045 Main Turbine Generator											X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR: 43.5)	4.3	1
055 Condenser Air Removal												Not Selected		0
068 Liquid Radwaste												Not Selected		0
071 Waste Gas Disposal												Not Selected		0
072 Area Radiation Monitoring												Not Selected		0
075 Circulating Water												Not Selected		0
079 Station Air												Not Selected		0
086 Fire Protection												Not Selected		0
K/A Category Totals:	0	0	0	0	0	0	0	1	0	0	1	Group Point Total:		2

ES-401	Generic Knowledge and Abilities Outline (Tier 3)	Form ES-401-3
Facility Waterford 3	Date of Exam: 11/12/2004	

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.22	Ability to determine Mode of Operation. (CFR: 43.2)			3.3	1
	2.1.4	Knowledge of shift staffing requirements. (CFR: 43.2)			3.4	1
	Subtotal					2
2. Equipment Control	2.2.31	Knowledge of procedures and limitations involved in initial core loading. (CFR: 43.6)			2.9*	1
	2.2.19	Knowledge of maintenance work order requirements. (CFR: 43.5)			3.1	1
	Subtotal					2
3. Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements. (CFR: 43.4.)			3.0	1
	Subtotal					1
4. Emergency Procedures/ Plan	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator. (CFR: 43.5)			4.0	1
	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. (CFR: 43.5)			4.3	1
	Subtotal					2
Tier 3 Point Total						7