

Draft Submittal
(Pink Paper)

FARLEY RETAKE AUGUST 2004 EXAM

50-348 & 50-364/2004-301

AUGUST 24, 2004

FINAL OUTLINE

Facility: Farley Nuclear Plant														Date of Exam: August 24, 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													18			4	3	7
	2													9			3	2	5
	Tier Totals													27			7	5	12
2. Plant Systems	1													28			3	1	4
	2													10			1	1	2
	Tier Totals													38			4	2	6
3. Generic Knowledge and Abilities Categories																			
														10	1	2	3	4	7
															2	2	2	1	

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 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.

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

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	SRO -G2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
000008 Pressurizer Vapor Space Accident / 3									
000009 Small Break LOCA / 3									
000011 Large Break LOCA / 3					X		SRO -EA2.01 - Actions to be taken, based on RCS temperature and pressure saturated and superheated.	4.7	1
000015/17 RCP Malfunctions / 4									
000022 Loss of Rx Coolant Makeup / 2						X	SRO -G2.4.10 - Knowledge of annunciator response procedures.	3.1	1
000025 Loss of RHR System / 4									
000026 Loss of Component Cooling Water / 8									
000027 Pressurizer Pressure Control System Malfunction / 3									
000029 ATWS / 1									
000038 Steam Gen. Tube Rupture / 3									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	SRO -G2.1.20 - Ability to execute procedure steps.	4.2	1
000054 (CE/E06) Loss of Main Feedwater / 4									
000055 Station Blackout / 6									
000056 Loss of Off-site Power / 6					X		SRO -AA2.09 - Operational status of reactor building cooling unit.	2.9	1
000057 Loss of Vital AC Inst. Bus / 6									
000058 Loss of DC Power / 6									
000062 Loss of Nuclear Svc Water / 4									
000065 Loss of Instrument Air / 8									
W/E04 LOCA Outside Containment / 3					X		SRO-EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.3	1
W/E11 Loss of Emergency Coolant Recirc. / 4					X		SRO -EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	4.2	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
K/A Category Totals:					4	3	Group Point Total:		18/7

ES-401 PWR Examination Outline Form ES-401-2
 Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / 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									
000003 Dropped Control Rod / 1						X	SRO -G2.1.11 – Knowledge of less than one hour technical specification action statements for systems.	3.8	1
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2									
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7						X	SRO -G2.2.22 – Knowledge of limiting conditions for operations and safety limits.	4.1	1
000036 (BW/A08) Fuel Handling Accident / 8						X	SRO -AA2.02 – Occurrence of a fuel handling incident.	4.1	1
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 9-8									1
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5									
000074 (W/E06&E07) Inad. Core Cooling / 4						X	SRO - EA2.2 – Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	4.1	1
000076 High Reactor Coolant Activity / 9									
W/E01 & E02 Rediagnosis & SI Termination / 3						X	SRO -EA2.1 – Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.2	1
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9									
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:						3 2	Group Point Total:		9/5

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

Facility: Farley Nuclear Plant

Date of Exam: August 24, 2004

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Category	K/A #	Topic	RO		SRO-Only	
			I R	#	IR	#
1. Conduct of Operations	2.1.12	Ability to apply technical specifications for a system.			4.0	1
	2.1.32	Ability to explain and apply all system limits and precautions.			3.8	1
	2.1.					
	2.1.					
	2.1.					
	2.1.					
	Subtotal					
2. Equipment Control	2.2.17	Knowledge of the process for managing maintenance activities during power operations.			3.5	1
	2.2.28	Knowledge of new and spent fuel movement procedures.			3.5	1
	2.2.					
	2.2.					
	2.2.					
	2.2.					
Subtotal						
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.			3.1	1
	2.3.9	Knowledge of the process for performing a containment purge.			3.4	1
	2.3.					
	2.3.					
	2.3.					
	2.3.					
Subtotal						
4. Emergency Procedures / Plan	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.			4.3	1
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	2.4.					
Subtotal						
Tier 3 Point Total				10		7

Facility: Farley Nuclear Plant		Date of Exam: August 24, 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					7
	2	1	2	1				2	2			1	9					5
	Tier Totals	4	5	4				5	5			4	27					12
2. Plant Systems	1	2	3	3	3	3	2	2	3	3	2	2	28					4
	2	1	1	1	1	1	1	1	1	1		1	10					2
	Tier Totals	3	4	4	4	4	3	3	4	4	2	3	38					6
3. Generic Knowledge and Abilities Categories					1	2	3	4					1	2	3	4		
					3	2	2	3	10					7				
<p>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.</p> <p>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.</p> <p>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.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>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.</p> <p>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.</p> <p>8. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.</p> <p>9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.</p>																		

ES-401 PWR Examination Outline Form ES-401-2 Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1		X					EK2.03 – Reactor trip status panel.	3.5	1
000008 Pressurizer Vapor Space Accident / 3						X	G2.4.47 – Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	3.4	1
000009 Small Break LOCA / 3						X	G2.4.4 – Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.0	1
000011 Large Break LOCA / 3									
000015/17 RCP Malfunctions / 4						X	G2.1.2 – Knowledge of operator responsibilities during all modes of plant operation.	3.0	1
000022 Loss of Rx Coolant Makeup / 2				X			AA1.01 – CVCS letdown and charging.	3.4	1
000025 Loss of RHR System / 4			X				AK3.01 – Shift to alternate flowpath.	3.1	1
000026 Loss of Component Cooling Water / 8					X		AA2.01 – Location of a leak in the CCWS.	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.15 – Actions to be taken in PZR pressure instrument fails high.	3.7	1
000029 ATWS / 1		X					EK2.06 – Breakers, relays, and disconnects.	2.9*	1
000038 Steam Gen. Tube Rupture / 3									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		X					EK2.2 – Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.6	1
000054 (CE/E06) Loss of Main Feedwater / 4	X		X				AK1.02 – Effects of feedwater introduction on dry S/G. AK3.04 – Actions contained in EOPs for loss of MFW.	3.6 4.4	1 1
000055 Station Blackout / 6					X		EA2.01 – Existing valve positioning on a loss of instrument air system.	3.4	1
000056 Loss of Off-site Power / 6	X						AK1.01 – Principle of cooling by natural convection.	3.7	1
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.04 – RWST and VCT valves.	3.5	1
000058 Loss of DC Power / 6				X			AA1.03 – Vital and battery bus components.	3.1	1
000062 Loss of Nuclear Svc Water / 4			X				AK3.02 – The automatic actions (alignments) within the nuclear service water resulting from the actuation of the ESFAS.	3.6	1
000065 Loss of Instrument Air / 8									
W/E04 LOCA Outside Containment / 3									
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	X						EK1.3 – Annunciators and conditions indicating signals, and remedial actions associated with the Loss of Secondary Heat Sink.	3.9	1
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:		18/7

ES-401 PWR Examination Outline Form ES-401-2
 Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / 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									
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2									
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8									
000037 Steam Generator Tube Leak / 3				X			AA1.08 – Charging flow indicator.	3.3	1
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 9-8				X			AA1.06 – Fire alarm.	3.5	1
000068 (BW/A06) Control Room Evac. / 8		X					AK2.01 – Auxiliary shutdown panel layout.	3.9	1
000069 (W/E14) Loss of CTMT Integrity / 5		X					AK2.03 – Personnel access hatch and emergency access hatch.	2.8*	1
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9					X		AA2.02 – Corrective actions required for high fission product activity in RCS.	2.8	1
W/E01 & E02 Rediagnosis & SI Termination / 3	X						EK1.2 – Normal, abnormal and emergency operating procedures associated with Reactor Trip or Safety Injection/ Rediagnosis.	3.4	1
W/E13 Steam Generator Over-pressure / 4			X				EK3.4 – RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.1	1
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9									
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4						X	G2.4.2 – Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. NOTE: The issue of setpoints and automatic safety features is not specifically covered in the systems sections.	3.9	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					X		EA2.1 – Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.1	1
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	1	2	1	2	2	1	Group Point Total:		9/5

ES-401PWR Examination Outline Form ES-401-2
 Plant Systems - Tier 2/Group 1 (RO / 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		X										K2.01 - RCPs	3.1	1
004 Chemical and Volume Control				X		X						K4.15 - Interlocks associated with operation of orifice isolation valves. K6.07 - Heat exchangers and condensers.	3.0* 2.7	1 1
005 Residual Heat Removal					X							K5.05 - Plant response during "solid plant": pressure change due to the relative incompressibility of water.	2.7*	1
006 Emergency Core Cooling	X											K1.11 - CCWS.	2.8	1
007 Pressurizer Relief/Quench Tank				X								K4.01 - Quench tank cooling.	2.6	1
008 Component Cooling Water			X					X				A2.04 - PRMS alarm. K3.03 - RCP.	3.3 4.1	1 1
010 Pressurizer Pressure Control					X		X					A1.03 - PRT pressure and temperature. K5.02 - Constant enthalpy expansion through a valve.	2.9 2.6	1
012 Reactor Protection			X						X			A3.04 - Circuit breaker. K3.01 - CRDS.	2.8* 3.9	1 1
013 Engineered Safety Features Actuation		X				X						K2.01 - ESFAS/safeguards equipment control. K6.01 - Sensors and detectors.	3.6* 2.7*	1 1
022 Containment Cooling										X		A4.01 - CCS fan.	3.6	1
025 Ice Condenser														
026 Containment Spray				X								K4.01 - Source of water for CSS, including recirculation phase after LOCA.	4.2	1
039 Main and Reheat Steam					X							K5.05 - Bases for RCS cooldown limits.	2.7	1
056 Condensate														
059 Main Feedwater								X				A2.11 - Failure of feedwater control system.	3.0*	1
061 Auxiliary/Emergency Feedwater										X		G2.1.12 - Ability to apply technical specifications for a system.	2.9	1
062 AC Electrical Distribution		X										K2.01 - Major system loads.	3.3	1
063 DC Electrical Distribution											X	G2.4.10 - Knowledge of Annunciator response procedures.	3.0	1
064 Emergency Diesel Generator									X			A3.01 - Automatic start of compressor and ED/G.	4.1	1
073 Process Radiation Monitoring	X		X									K1.01 - Those systems served by PRMs. K3.01 - Radioactive effluent releases.	3.6	1
076 Service Water								X				A2.02 - Service water header pressure.	2.7	1
078 Instrument Air									X	X		A3.01 - Air pressure. A4.01 - Pressure gauges.	3.1 3.1	1 1
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity.	3.7	1
K/A Category Point Totals:	2	3	3	3	3	2	2	3	3	2	2	Group Point Total:		28/4

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

Facility: Farley Nuclear Plant

Date of Exam:

August 24, 2004

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0	1		
	2.1.22	Ability to determine Mode of Operation.	2.8	1		
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1		
	2.1.					
	2.1.					
	2.1.					
	Subtotal					
2. Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1		
	2.2.26	Knowledge of refueling administrative requirements.	2.5	1		
	2.2.					
	2.2.					
	2.2.					
	2.2.					
Subtotal						
3. Radiation Control	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	2.6	1		
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1		
	2.3.					
	2.3.					
	2.3.					
	2.3.					
Subtotal						
4. Emergency Procedures / Plan	2.4.17	Knowledge of EOP terms and definitions.	3.1	1		
	2.4.27	Knowledge of fire in the plant procedure.	3.0	1		
	2.4.43	Knowledge of emergency communications systems and techniques.	2.8	1		
	2.4.					
	2.4.					
	2.4.					
Subtotal						
Tier 3 Point Total				10		7

