Final Submittal

FARLEY JAN. 2005 EXAM
50-348 & 50-364/2005301

JANUARY 10 - 14, 2005
JANUARY 18, 2005 (written)

FINAL SAMPLE PLANS / OUTLINES

FINAL

Facility: Farley Nuclear Plant Date of Exam: January 10, 2005

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			4	2	6
	2	1	2	1				1	2			2	9			2	2	4
	Tier Totals	4	5	4				4	5			5	27			6	4	10
2. Plant Systems	1	2	2	3	3	3	2	2	3	2	3	3	28			2	3	5
	2	1	1	1	1	1	1	1	1	0	1	1	10			2	1	3
	Tier Totals	3	3	4	4	4	3	3	4	2	4	4	38			4	4	8
3. Generic Knowledge and Abilities Categories		1			2			3			4			1	2	3	4	
		2			3			2			3		10	1	2	2	2	7

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401 PWR Examination OutlineForm 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									
000008 Pressurizer Vapor Space Accident / 3			X				AK3.02 Why PORV or code safety exit temperature is below RCS or PZR temperature	3.6	1
000009 Small Break LOCA / 3				X			EA1.02 – RB sump level	3.8	1
000011 Large Break LOCA / 3		X					EK2.02-pumps	2.6*	1
					S		SRO- EA2.13 – Difference between overcooling and LOCA indications	3.7*	1
000015/17 RCP Malfunctions / 4					S		SRO-AA2.08 – When to secure RCPs on high bearing temperatures.	3.5	1
000022 Loss of Rx Coolant Makeup / 2					X		AA2.02 –Charging pump problems	3.2	1
000025 Loss of RHR System / 4		X					AK2.02 – LPI or Decay Heat Removal/RHR pumps	3.2*	1
						S	SRO – G2.1.32 – Ability to explain all system limits and precautions	3.8	1
000026 Loss of Component Cooling Water / 8				X			AA1.02 – Loads on CCWS in the control room.	3.2	1
					S		SRO-AA2.02 – The cause of possible CCW loss.	3.6	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 – Controllers and positioners.	2.6	1
000029 ATWS / 1					X		EA2.09 – Occurrence of a main turbine/reactor trip	4.4	1
						S	SRO – G2.4.21 – 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. RCS integrity 4. Containment conditions 5 Radioactivity release.	4.3	1
000038 Steam Gen. Tube Rupture / 3	X						EK1.03 – Natural Circulation	3.9	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	G2.1.2 – Knowledge of operator responsibilities during all modes of plant operation.	3.0	1
000054 (CE/E06) Loss of Main Feedwater / 4	X						AK1.01 – MFW line break depressurizes the S/G (similar to a steam line break)	4.1	1
					S		SRO-AA2.04 – proper operation of AFW pumps and regulating valves.	4.3	1
000055 Station Blackout / 6					X		EA2.03 – Actions necessary to restore power	3.9	1
000056 Loss of Off-site Power / 6			X				AK3.01 – Order and time to initiation of power for the sequencer	3.5	1
000057 Loss of Vital AC Inst. Bus / 6						X	G2.4.31 – Knowledge of annunciators alarms and indications, and use of the response procedures.	3.3	1
000058 Loss of DC Power / 6	X						AK1.01 – Battery charger equipment and instrumentation.	2.8	1
000062 Loss of Nuclear Svc Water / 4									
000065 Loss of Instrument Air / 8				X			AA1.03 Restoration of systems served by Instrument air when air pressure is regained	2.9/ 3.1	1
W/E04 LOCA Outside Containment / 3			X				EK3.2 – Normal, abnormal and emergency operating procedures associated with LOCA outside containment.	3.4	1
W/E11 Loss of Emergency Coolant Recirc. / 4						X	G2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
K/A Category Totals:	3	3	3	3	3 4	3 2	Group Point Total:		18 6

ES-401 PWR Examination OutlineForm 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		X					AK2.04 -Pumps	2.6	1
000028 Pressurizer Level Malfunction / 2		X					AK2.03 – Controllers and Positioners	2.6	1
					S		SRO- AA2.02 – PZR level as a function of power level or T-ave including interpretation of malfunction	3.8	1
000032 Loss of Source Range NI / 7						S	SRO- G2.4.46 – Ability to verify that alarms are consistent with the plant conditions.	3.6	1
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8	X						AK1.01 – radiation exposure hazards	3.5	1
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9					X		AA2.05 – The occurrence of automatic safety actions as a result of a high PRM system signal.	3.6	1
000060 Accidental Gaseous Radwaste Rel. / 9					S		SRO – AA2.05 – that the automatic safety actions have occurred as a result of a high ARM system signal.	4.2	1
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				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
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9						X	G2.1.23 – Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	1
W/EO1 & **E02** *Rediagnosis* & **SI Termination** / 3					X		WE02 – EA2.1 – Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.3	1
						S	SRO-WE01 G2.1.20 – Ability to execute procedure steps	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			X				EK3.3 – Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.5	1
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; **W/E08 RCS Overcooling** - PTS / 4						X	G2.4.48 – 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.	3.5	1
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	1	2	1	1	2 2	2 2	Group Point Total:		9/4

ES-401PWR Examination OutlineForm ES-401-2
Plant Systems - Tier 2/Group 1 (RO / SRO)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump					X							K5.04 – Effects of RCP shutdown on secondary parameters, such as steam pressure, steam flow and feed flow	3.2	1
004 Chemical and Volume Control					X							K5.49 – Purpose and method of hydrogen removal from the RCS before opening system: explosion hazard, nitrogen purge	2.7	1
											X	G2.4.35 – Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.3	1
								S				SRO- A2.14 – Emergency Boration	3.9	1
005 Residual Heat Removal		X										K2.01 – RHR pumps.	3.0	1
										X		A4.02 – Heat exchanger bypass flow control	3.4*	1
006 Emergency Core Cooling					X							K5.05 – Effects of pressure on a solid system	3.4	1
											X	G2.1.33 – Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
007 Pressurizer Relief/Quench Tank							X					A1.03 – Monitoring quench tank temperature	2.6	1
008 Component Cooling Water		X								X		K2.02 – CCW pump, including emergency backup	3.0*	1
												A4.07 – Control of minimum level in the CCWS surge tank	2.9*	1
010 Pressurizer Pressure Control				X								K4.02 – Prevention of uncovering PZR heaters	3.0	1
012 Reactor Protection						X						K6.10 – Permissive circuits	3.3	1
						X						K6.02- Redundant channels	2.9	1
013 Engineered Safety Features Actuation	X											K1.01 – Initiation signals for ESF circuit logic	4.2	1
				X								K4.03 – Main steam isolation System	3.9	1
022 Containment Cooling								X				A2.04 – Loss of Service water	2.6	1
025 Ice Condenser														
026 Containment Spray										X		A4.05 – Containment spray reset switches	3.5	1
								S				SRO-A2.08 -Safe securing of CS (when it can be done)	3.7	1
039 Main and Reheat Steam			X									K3.04 – MFW pumps	2.5*	1
059 Main Feedwater									X			A3.02 – Programmed levels of the S/G	2.9	1
061 Auxiliary/Emergency Feedwater	X											K1.07 – Emergency water source	3.6	1
									X			A3.03 – AFW S/G level control on automatic start	3.9	1
062 AC Electrical Distribution								X				A2.01 – Types of loads that, if de-energized, would degrade or hinder plant operation	3.4	1
063 DC Electrical Distribution							X					A1.01 – Battery capacity as it is affected by discharge rate	2.5	1
064 Emergency Diesel Generator				X								K4.02 – Trips for ED/G while operating (normal or emergency)	3.9	1
											S	G2.2.22 – Knowledge of limiting conditions for operations and safety limits.	4.1	1
073 Process Radiation Monitoring											S	SRO-G2.2.25 – Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
076 Service Water			X									K3.07 – ESF loads	3.7	1
											S	SRO – G2.1.20 – ability to execute procedure steps	4.2	1
078 Instrument Air			X									K3.01 – Containment air system	3.1*	1
											X	G2.1.30 – Ability to locate and operate components, including local controls	3.9	1
103 Containment								X				A2.03 – Phase A/B isolation	3.5*	1
K/A Category Point Totals:	2	2	3	3	3	2	2	3 2	2	3	3 3	Group Point Total:		28/5

ES-401PWR Examination OutlineForm ES-401-2
Plant Systems - Tier 2/Group 2 (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	#
001 Control Rod Drive							X					A1.02 – T-ref	3.1	1
002 Reactor Coolant								S				A2.03 – Loss of forced circulation.	4.3	1
011 Pressurizer Level Control														
014 Rod Position Indication										X		A4.04 – Re-zeroing of rod position prior to startup.	2.7	1
015 Nuclear Instrumentation		X										K2.01 – NIS channels, components, and interconnections.	3.3	1
016 Non-nuclear Instrumentation			X									K3.08 – PZR PCS	3.5*	1
017 In-core Temperature Monitor	X											K1.02 – RCS	3.3	1
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control											S	SRO- G2.4.48 – 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
029 Containment Purge								X				A2.03 – Startup operations and the associated required valve lineups	2.7	1
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment				X								K4.03 – overload protection	2.6	1
035 Steam Generator						X						K6.02 – secondary PORV	3.1	1
041 Steam Dump/Turbine Bypass Control											X	G2.2.2 – Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	1
045 Main Turbine Generator														
055 Condenser Air Removal														
056 Condensate														
068 Liquid Radwaste								S				SRO-A2.04-Failure of automatic isolation	3.3	1
071 Waste Gas Disposal					X							K5.04 – Relationship of hydrogen/oxygen concentrations to flammability.	2.5	1
072 Area Radiation Monitoring														
075 Circulating Water														
079 Station Air														
086 Fire Protection														
K/A Category Point Totals:	1	1	1	1	1	1	1	1 2	0	1	1 1	Group Point Total:		10/3

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

Facility: Farley Nuclear Plant Date of Exam: January 10,2005 :

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		
	2.1.8	Ability to co-ordinate personnel activities outside the control room.	3.8	1		
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.			4.0	1
	Subtotal			2		1
2. Equipment Control	2.2.3	(multi-unit) Knowledge of the design, procedural, and operational differences between units.	3.1	1		
	2.2.12	Knowledge of surveillance procedures.	3.0	1		
	2.2.28	Knowledge of new and spent fuel movement procedures.	2.6	1		
	2.2.22	Knowledge of limiting conditions for operations and safety limits.			4.1	1
	2.2.29	Knowledge of SRO fuel handling responsibilities			3.8	1
	Subtotal			3		2
3. Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1		
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1		
	2.3.1	Knowledge of 10 CFR:20 and related facility radiation control requirements.			3.0	1
	2.3.6	Knowledge of the requirements for reviewing and approving release permits.			3.1	1
	Subtotal			2		2
4. Emergency Procedures / Plan	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	2.8	1		
	2.4.31	Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1		
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.3	1		
	2.4.9	Knowledge of low power/shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.			3.9	1
	2.4.41	Knowledge of the emergency action level thresholds and classifications.			4.1	1
	Subtotal			3		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1 073K4.01	Replaced with 013K4.03	This KA had the same knowledge and information as 2 other KAs on the exam already and one SRO level question on radiation monitors.
3/ G2.3.9	Replaced with 2.3.2	KA 029a2.03 is on RO exam which examines the same concept. Also this is part of the Admin JPM exam.
1/2 SRO-028AA2.07	Replaced with 028AA2.02	This is a topic that can not be written at an SRO level and meet the KA.
2/1 026A4.01	Replaced with 005A4.02	Too many 026 KAs randomly selected.
2/1 059A3.04	Replaced with 061A3.03	Too many KAs dealing with MFW pumps.
2/1 003K5.05	Replaced with 003K5.04	This is a * item that does not fit FNP operating procedures.
1/1 026AA 1.03	Replaced with 026AA1.02	This is a * item that does not fit FNP.
1/1 057 G2.4.20	Replaced with 057G2.4.31	This subject was not found in the EOP network but is found in the ARP network.
1/1 025 G2.4.21	Replaced with 025G2.1.32	This generic KA did not fit Loss of RHR.
1/1 029 G2.1.32	Replaced with 029G2.4.21	This generic KA did not fit ATWS event. I swapped G2.4.21 with G2.1.32 above.
1\2 SRO 004A2.18	Replaced with 004A2.14	This subject matter could not support an SRO level question.
1/1 SRO 015/17 AA2.09	Replaced with 015/17AA2.08	There are no high stator temperature shutdown requirements on the RCPs. No question could be developed for this K/A.
1/1 025 AK2.03	Replaced with 025AK2.02	Too many CCW questions on exam. There were a total of 6 at one time. There are 4 at present.
1/1 055 EA2.06	Replaced with 055 EA2.03	EA2.06 does not have any ties to our plant.
1/1 065 AA1.04	Replaced with 065 AA1.03	Ka could not be met. Our facility does not have a standard to monitor or operate the EAC at a discriminatory value. We turn on the EAC and align valves to function. NRC agreed this was not a discriminatory KA for our facility and the NRC randomly selected AA1.03 as the new KA to replace it. 10-5-2004