Draft Submittal

MCGUIRE JUNE 2003 EXAM 50-369/2003-301 AND 50-370/2003-301

JUNE 16 - 30, 2003

1. Written Exam Sample outlines

Facility: McGuire Date ofExam: Weeks of June 16 and 23, 2003

Tier	Group	RO K/A Category Points											~~Point~~ Total	SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *		K	A	A 2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	6	2	3				3	2			2	~~24~~18			7	0	7
	2	2	2	2				1	1			1	~~16~~9			4	1	5
	~~3~~												~~3~~					
	Tier Totals	8	4	5				4	3			3	~~43~~27			1	1	12
2. Plant Systems	1	2	1	3	4	3	2	3	3	2	3	2	~~19~~28			1	3	4
	2	1	2	1	1	1	1	0	0	2	0	1	~~17~~10			1	1	2
	~~3~~												4					
	Tier Totals	3	3	4	5	4	3	3	3	4	3	3	~~40~~38			2	4	6
3. Generic Knowledge and Abilities Categories					~~Cat~~ 1		~~Cat~~ 2		~~Cat~~ 3		~~Cat~~ 4		~~17~~10	1	2	3	4	7
					2		2		3		3			2	2	1	2	

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier of the F not be less than two). Refer to Section D.1.c for additional guidance regarding SRO sampli
2. The point total for each group and tier in the proposed outline must match that specified in tl deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam r points.
3. Select topics from many systems and evolutions; avoid selecting more than two ~~or three~~ K/A 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, b system. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning obje
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' and the point totals for each system and category. ~~K/As below 2.5 should be justified on th~~ totals for each category in the table above; summarize all the SRO-only knowledge and nor Use duplicate pages for RO and SRO-only exams.

h. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Forn

i. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A

ES-401 — PWR Examination Outline — Form ES-401-3

Emergency and Abnormal Plant Evolutions - Tier 1/Group1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Bank Question	Level	Source Information: Lesson Plan	NRC	Bank	Mod	New	Memory	Comp	Analysis
000007 Reactor Trip - Stabilization - Recovery / 1				1.04			Ability to operate and monitor the following as they apply to a reactor trip: RCP operation and flow rates	3.6	1	63.1	RO			X					X
000008 Pressurizer Vapor Space Accident / III					2.06		Ability to determine and interpret the following at they apply to the Pressurizer Vapor Space Accident: PORV logic control under low-pressure conditions	3.3	1	1022	RO					X	X		
000009 Small Break LOCA / III			3.13				Knowledge of the reason for the following responses as they apply to the small break LOCA: Stopping the affected RCP	3.4	1	1025	RO					X		X	
000011 Large Break LOCA							Deselected												
000015/17 RCP Malfunctions / 4					2.01		Ability to determine and interpret the following as they apply to the RCP Malfunction: Cause of RCP failure	3.00	1	1023.00	RO					X	X		
000022 Loss of Reactor Coolant Makeup / II	1.01						Knowledge of the operational implication of the following concepts as they apply to the Loss or Reactor Coolant Pump Makeup: Consequences of thermal shock to RCP seals.	2.8	1	1026	RO					X	X		
000025 Loss of RHR System / IV		2.02					Knowledge of the interrelations between the Loss of RHR System and the following: LPI or Decay Heat Removal/RHR pumps.	3.2	1	1027	RO					X	X		
000025 Loss of RHR System / IV					2.05		Ability to determine and interpret the following as they apply to the Loss of RHR System: Limitations of LPI flow and temperature rates of change	3.1	1		SRO								
000026 Loss of Component Cooling Water / 8						2.4.4	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. 2.4.47	3.4	1		RO								
000027 Pressurizer Pressure Control System Malfunction / 3			3.03				Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Actions contained in EOP for Pzr PCS malfunctions.	3.7	1	1024	RO					X		X	
000029 ATWS	1.01						Knowledge of the operational implications of the following concepts as they apply to the ATWS: Reactor nucleonics and thermo-hydraulics behavior.	2.8	1		RO								
000029 ATWS					2.02		Ability to determine or interpret the following as they apply to a ATWS: Reactor trip alarm.	4.2	1	1035	SRO					X			X
000038 Steam Generator Tube Rupture / III	1.02						Knowledge of the operational implications of the following concepts as they apply to the SGTR: Leak rate vs. pressure drop	3.2	1		RO								
000040 W/E12 Steam Line Rputure- Excessive Heat Transfer / 4			3.01				Knowledge of the reason for the following responses as they apply to the Steam Line Rupture: Operation of steam line isolation valves	4.2	1	1028	RO					X	X		
000040 W/E12 Steam Line Rupture - Excessive Heat Transfer / 4				1.30			(W/E12) Ability to operate and or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators) Desired operating results during abnormal and emergency situtations.	3.4	1	593.1	RO			X				X	
000040 W/E12 Steam Line Rupture - Excessive Heat Transfer / 4					2.10		(Uncontrolled Depressurization of all Steam Generators) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.2	1	1037	SRO					X		X	
000054 Loss of Main Feedwater / IV					2.04		Ability to determine and interpret the following as they apply to the Loss of Main Feedwater: Proper operation of AFW pumps and regulating valves.	4.2	1	965.1	SRO					X		X	
000055 Station Blackout / 6				1.02			Ability to operate and monitor the following as they apply to a Station Blackout: Manual ED/G start.	4.3	1	1036	RO					X	X		
000056 Loss of Offsite Power / 6	1.04						Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of saturation conditions, implications for the systems.	3.1	1		RO								

000058 Loss of Offsite Power / 6					2.3		Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Transient trend of coolant temperature toward no-load Tave.	4.3	1		SRO									
000057 Loss of Vital AC Inst Bus / 6							Deselected													
000058 Loss of DC Power / 8	1.01						Knowledge of the operational implications of the following concepts at they apply to Loss of DC Power: Battery charger equipment and instrumentation	2.8	1		RO									
000062 Loss of Nuclear Service Water / 4					2.02		Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible SBS loss.	3.6	1	894.1	SRO				X				X	
000065 Loss of Instrument Air / 8							Deselected													
W/E04 LOCA Outside Containment	1.10						Knowledge of the operational implicatoins of the following concepts as they apply to the (LOCA Outside Containment): Components, capacity, and function of emergency systems.	3.5	1		RO									
W/E04 LOCA Outside Containment		2.10					Containment) and the following: Compontents, and functions of control and safety systems, including instrumentation, signal, interlocks failure modes , and automatic and manual features.	3.5	1		RO									
W/E11 Loss of Emergency Coolant Recirc / 4					2.10		Ability to determine and interpret the following as they apply to the (Loss of Emergency Coolant Recirculation) Facility conditions and the selection of appropriate procedures during abnormal and emergency operations.	3.4	1	1039	SRO					X			X	
W/E05 Inadequate Heat Sink/Loss of Secondary Heat Sink / 4						2.1.2	Ability to determine Mode of Operation	2.8	1		RO									
K/A Category Totals:							Group Point Total:													

ES-401 — PWR Examination Outline — Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 — Form ES-401-3

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Level	Bank Question	Lesson Plan	Source Information: NRC	Bank	Mod	New	Memory	Comp	Analysis
000001 Continuous Rod Withdrawal / 1							Deselected												
000003 Dropped Control Rod / 1	1.07						Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Effect of dropped rod on insertion limits and SDM.	3.1	1	RO	1029					X		X	
000005 Inoperable/Stuck Control Rod /1							Deselected												
000024 Emergency Boration / 1							Deselected												
000028 Pressurizer Level Malfunction / 2					2.09		Ability to operate and/or monitor the following as they apply to the Pressurizer Level Contrl Malfunctions: Charging and letdown flow capacities	3.2	1	SRO	902.1			X				X	
000032 Loss of Source Range NI / 7							Deselected												
000033 Loss of Intermediate Range NI / 7							Deselected												
000036 Fuel Handling Accident / 8					2.09		Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: Magnitude of potential radioactive release	3.1	1	SRO									
000037 Steam Generator Tube Leak							Deselected												
000051 Loss of Condenser Vacuum / IV			3.01				Knowledge for the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capacity upon loss of condenser vacuum.	2.8	1	RO	373.1			X				X	
000051 Loss of Condenser Vacuum / IV				1.04			Ability to operate and/or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.	2.5	1	RO	963.1			X				X	
000059 Accidential Liquid Rad/Waste Rel / 8							Deselected												
000060 Accidential Gaseous Radwaste Rel / 8						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	SRO									
000061 ARM System Alarms / 7							Deselected												
000067 Plant Fire On-site / 8			3.02				Knowledge of the reason for the following responses as they apply to the Plant Fire on Site: Steps called out in the site fire protection plan, FPS manual, and fire zone manual.	2.5	1	RO									
000068 Control Room Evac / 8					2.04		Ability to determine and interpret the following as they apply to the Control Room Evacuation: S/G Pressure	3.7	1	RO	1034					X		X	
000069 (W/E14) Loss of CTMT Integrity / V							Deselected												
000074 (W/E06&E07) Inad. Core Cooling / IV					2.10		(EO7) Ability to determine and interpret the following as they apply to the (Saturated Core Cooling): Facility conditions and selection of appropriate procedures during abnormal and emergency conditions	4.0	1	SRO	778.1			X			X		
000076 High Reactor Coolant Activity / 9							Deselected												

W/E01 & E02 Rediagnosis & SI Termination	1.20						concepts as they apply to the: Nommal, abnormal and emergency operating procedures associated with (Reactor Trip or Safety Injection/Rediagnosis)	3.4	1	RO	195.5			X			X		
WE01 & E02 Rediagnosis & SI Termination		2.20					and the following: Facility's heat removal systems, including primary coolant, emergency coolant, decay heat removal, and relations between the proper operating of these systems to the operation of the	3.5	1	RO									
W/E13 Steam Generator Over-pressure / 4							Deselected													
W/E15 Containment Flooding						2.1.7	Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	1	RO	891.2			X			X		
W/E16 High Containment Radiation / 9					2.1D		Ability to determine and interpret the following as they apply to the (High Containment Radiation): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.3	1	SRO	1042						X		X
BW/A01 Plant Runback / 1							Deselected													
BW/A02 & A03 Loss of NNI / 7							Deselected													
BW/A04 Turbine Trip / 4							Deselected													
BW/A05 Emergency Diesel Actuation / 6							Deselected													
BW/A07 Flooding							Deselected													
BW/E03 Inadequate Subcooling Margin / 4							Deselected													
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Deselected													
BW/E09; CE/A13;W/E9&10 Natural Circ. / 4		2.10					Operations) and the following: Components, and functions of control and safety features, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.2	1	RO	911.1			X			X		
BW/E13&14 EOP Rules and Enclosures							Deselected													
CE/A11; W/E08 RCS Overcooling - PTS / 4							Deselected													
CE/A16 Excess RCS Leakage / 2							Deselected													
CE/E09 Functional Recovery							Deselected													
K/A Category Totals:	4	1	5	3	8	3	Group Point Total:	24	24	10 SRO	6		0	0	0	0	0	0	0

24 Sampled
24 Target Sample

ES-401 — PWR Examination Outline — Plant Systems - Tier 2 Group 1 — Form ES-401-3

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)	Imp.	Points	Level	Bank Question	Lesson Plan	Source Information: NRC	Bank	Mod	New	Memory	Comp	Analysis
003 Reactor Coolant Pump						6.04						Knowledge of the effect of a loss or malfunction on the following will have on the RCPS: Containment isolation vlaves affecting RCP operation.	2.8	1	RO	1030					X	X		
003 Reactor Coolant Pump									3.03			Ability to monitor automatic operation of the RCPS, including: Seal D/P	3.2	1	RO	977.1			X				X	
004 Chemical Volume and Control	1.16											Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: Boric acid storage tank.	3.3	1	RO	1050					X			X
005 Residual Heat Removal						6.03						Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger.	2.5	1	RO	1047					X	X		
006 Emergency Core Cooling			3.01									Knowledge of the effect that a loss or malfunction of the ECCS will have on the following: RCS	4.1	1	RO	1046					X	X		
006 Emergency Core Cooling											2.2.2	Knowledge of the process for determining if the proposed change, test or experiment involves an unreviewed safety question.	3.2	1	SRO									
007 Pressurizer Relief/Quench Tank								2				(A2.02) Ability to predict impacts of the following malfunctions or operatons on P S: and (b) based on those predicitons, use procedures to correct, control, etc., Abnormal pressure in the PRT	2.6	1	RO	617.2			X			X		
008 Component Cooling Water										4.06		Ability to manually operate and/or monitor in the control room: Remote operation of hand-operated throttle valves to regulate CCW flow rate.	2.50	1	RO									
010 Pressurizer Pressure Control					5.01							Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables.		1	RO	311.20			X					X
010 Pressurizer Pressure Control											2.1.3	(2.1.31) Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	4.20	1	RO	164.20			X				X	
012 Reactor Protection					5.01							Knowledge of the operational implications of the folloiwng concepts as they apply to the RPS: DNB	3.30	1	RO	48.10			X			X		
012 Reactor Protection			3.02									Knowledge of the effect that a loss or malfunction of the RPS will have on the following: T/G	3.20	1	RO	107.10			X			X		
013 Engineered Safety Features Actuation				4.11								Knowledge of design feature(s) and/or interlock(s) which provide for...Vital power load control	3.2	1	RO	548.1			X			X		
022 Containment Cooling		2.01										Knowledge of the power supplies to the following: Containment cooling fans.	3.0	1	RO	957.1			X			X		
022 Containment Cooling											2.1.12	(2.1.12) Ability to apply Technical Specifications	3.4	1	SRO	1054					X		X	
025 Ice Condenser			3.01									Knowledge of the effect that a loss or malfunction of the ice condenser system will have on the following: Containment	3.8	1	RO	1039					X		X	
025 Ice Condenser											2.2.22	(2.2.22) Knowledge of limiting conditions for operations.	3.8	1	SRO	40.1			X			X		
026 Containment Spray											2.4.5	(2.4.50) Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	1	RO	1051					x			x
039 Main and Reheat Steam							1.09					Ability to predict and/or monitor changes in paramets associated with oerating the MRSS controls inluding: Main steamline radiation monitors.	2.5	1	RO	605.1			X				X	

039 Main and Reheat Steam									4.04		Ability to manually operate and/or monitor in the control room: Emergency feedwater pump turbines.	3.8	1	RO	1032					X		X	
056 Condensate							2.04				Loss of condensate pumps.	2.6	1	RO	532.1			X			X		
059 Main Feedwater			4.02								Knowledge of the MFW design feature(s) and/or interlock(s) which provide for	3.30	1	RO	1031.00					X		X	
061 Auxiliary/Emergency Feedwater				5.01							Knowledge of the operational implications of the following concepts as they apply to the AFW: Relationship between AFW flow and RCS heat transfer	3.6	1	RO									
062 AC Electrical Distribution	1.03										Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the following systems: DC distribution.	3.5	1	RO	1038					X	X		
063 DC Electrical Distribution						1.01					Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate.	2.5	1	RO	906.1			X			X		
064 Emergency Diesel Generator			4.02								Knowledge of ED/G design features and or interlock(s) which provide for: Trips for ED/G while operating (normal or emergency)		1	RO	1048					x	x		
064 Emergency Diesel Generator									4.07		Ability to manually operate and/or monitor in the control room: Transfer ED/G with load to grid.	4.0	1	RO	1049					x	x		
073 Process Radiation Monitoring							2.02				Ability to predict the impacts of the following malfunctions or operations on the PRM system.....Detector failure.	2.7	1	RO	671.3			x					X
076 Service Water						1.02					Ability to predict and/or monitor changes in parameters associated with operating the SWS controls including: Reactor and turbine building closed cooling water temperatures	2.6	1	RO									
078 Instrument Air			4.01								Knowledge of IAS design feature(s) and /or interlock(s) which provide for the following: Manual/automatic transfers of control.	2.7	1	RO	451.1			X			X		
103 Containment							2.01				Ability to predict the impacts of the following malfunctions operations on the containment system and based on the predictions , integrated leak rate test	2.8	1	SRO									
103 Containment								3.01			Ability to monitor automatic operation of the containment system, including: Containment isolation.	3.9	1	RO	162.1			x			x		
K/A Category Totals:	3	1	3	5	1	0	0	0	1	3	2	Group Point Total:	19	19	1 SRO	4		0	0	0	0	0	0	0

ES-401 PWR Examination Outline Form ES-401-3

Plant Systems - Tier 2 Group 2

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)	Imp.	Points	Level	Bank Question	Source Information: NRC	Bank	Mod	New	Memory	Comp	Analysis
001 Control Rod Drive		2.05										Knowledge of the bus power supplies to the following: M/G sets	3.1	1	RO	1040				X	X		
002 Reactor Coolant						6.06						Knowledge of the effect or a loss or malfunction on the following RCS components: Sensors and Detectors	2.5	1	RO	1043				X		X	
011 Pressurizer Level Control												Deselected											
014 Rod Position Indication										4.02		Ability to manually operate and/or monitor in the control room: Control rod mode-select switch.	3.4	1	RO	1044				X	X		
015 Nuclear Instrumentation			3.03									Deselected											
016 Non-nuclear Instrumentation					5.01							Knowledge of the operational implication of the following concepts as they apply to the NNIS: Separation of control and protection circuits.	2.7	1	RO								
017 In-core Temperature Monitor										3.01		Ability to monitor automatic operaton of the ITM system including: Indications of normal, natural, and interrupted circulaton of the RCS.	3.6	1	RO	911.1		X			X		
027 Containment Iodine Removal	1.01											Knowledge of the physical connections and/or cause-effect relatoinships between the CIRS and the following systems: CSS	3.4	1	RO								
028 Hydrogen Recombiner and Purge Control		2										(2.01) Knowledge of bus power supplies to the following: Hydrogen recombiners	2.5	1	RO	1041				X	X		
029 Containment Purge				4.02								Knowledge of design feature(s) and/or interlock(s) which provide for the following: Negative pressure in containment.	2.9	1	RO	28.1		X				X	
033 Spent Fuel Pool Cooling								2.02				Ability to predict the impacts of the following malfunctions or operations: Loss of SFPCS	3.0	1	SRO	892.3		X				X	
034 Fuel Handling Equipment												Deselected											
035 Steam Generator												Deselected											
041 Steam Dump/Turbine Bypass Control											2.4.20	(2.4.20) Knowledge of operational implication of EP warnings, cautions, and notes	3.0	1	SRO								
045 Main Turbine Generator												Deselected											
055 Condenser Air Removal			3.01									Knowledge of the effect that a loss or malfunction of the CARS will have on the following: Main condenser	2.5	1	RO	547.2		X				X	
068 Liquid Radwaste												Deselected											
071 Waste Gas Disposal												Deselected											
072 Area Radiation Monitoring									3.01			Ability to monitor automatic operation of the ARM system including: Changes in ventilation alignment	2.9	1	RO	976.1		X			X		

075 Circulating Water											Deselected											
079 Station Air											Deselected											
086 Fire Protection											Deselected											
K/A Category Totals:	1	0	2	0	1	2	4	3	2	1	1	Group Point Total:	19	17	2 SRO	4		0	0	0	0	0	0	0

21 SRO systems - 17 SRO K/As
20? RO K/As are imported
Randomly delete 3? SRO K/As - make RO only

17 Sampled
17 Target Sample

PWR SRO Examination Outline **ES-401-4**

Facility: McGuire **Date of Exam: 7/29/02** **Exam Level: SRO**

Tier	Group	K/A Category Points K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Point Total	Target
1 Emergency & Abnormal Plant Evolutions	1	4	2	5				3	8			2	24	24
	2	1	1	3				5	6			0	16	16
	3	0	0	1				1	1			0	3	3
	Tier Totals	5	3	9				9	15			2	43	43
2 Plant Systems	1	3	2	2	5	1	0	0	0	1	3	2	19	19
	2	1	0	2	0	1	2	4	3	2	1	1	17	17
	3	0	0	1	1	0	0	0	2	0	0	0	4	4
	Tier Totals	4	2	5	6	2	2	4	5	3	4	3	40	40
3	Generic Knowledge and Abilities				Cat 1: 4		Cat 2: 4		Cat 3: 5		Cat 4: 4		17	17

Totals

Notes: **1.** Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).

2 The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final exam must total 100 points.

3 Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.

4 Systems/evolutions within each group are identified on the associated outline.

5 The shaded areas are not applicable to the category/tier.

6* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.

7 On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

SRO Exam Vital Statistics

Source of Questions

NRC Exams	0
Utility Bank	0
New	0
Modified	0
	0

Level of Knowledge

Memory	0
Comprehension	0
Analysis	0
	0

Repeat of Audit Questions **0**

10 CFR 55.43 Cross References

Question	Sub Part (b)
1 SRO Only	5
2 SRO Only	5
3 SRO Only	5
4 SRO Only	5
5 SRO Only	5
6 SRO Only	5
7 SRO Only	5
8 SRO Only	1
9 SRO Only	3
10 SRO Only	4
11 SRO Only	2

ES-401 — PWR Examination Outline — Emergency and Abnormal Plant Evolutions - Tier 1/Group1 — Form ES-401-3

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Bank Question	Level	Source Information: Lesson Plan	NRC	Bank	Mod	New	Memory	Comp	Analysis
000007 Reactor Trip - Stabilization - Recovery / 1				1.04			Ability to operate and monitor the following as they apply to a reactor trip: RCP operation and flow rates	3.6	1	63.1	RO			X					X
000008 Pressurizer Vapor Space Accident / III					2.06		Ability to determine and interpret the following at they apply to the Pressurizer Vapor Space Accident: PORV logic control under low-pressure conditions	3.3	1	1022	RO					X	X		
000009 Small Break LOCA / III			3.13				Knowledge of the reason for the following responses as they apply to the small break LOCA: Stopping the affected RCP	3.4	1	1025	RO					X		X	
000011 Large Break LOCA							Deselected												
000015/17 RCP Malfunctions / 4					2.01		Ability to determine and interpret the following as they apply to the RCP Malfunction: Cause of RCP failure	3.00	1	1023.00	RO					X	X		
000022 Loss of Reactor Coolant Makeup / II	1.01						Knowledge of the operational implication of the following concepts as they apply to the Loss or Reactor Coolant Pump Makeup: Consequences of thermal shock to RCP seals.	2.8	1	1026	RO					X	X		
000025 Loss of RHR System / IV		2.02					Knowledge of the interrelations between the Loss of RHR System and the following: LPI or Decay Heat Removal/RHR pumps.	3.2	1	1027	RO					X	X		
000025 Loss of RHR System / IV					2.05		Ability to determine and interpret the following as they apply to the Loss of RHR System: Limitations of LPI flow and temperature rates of change	3.1	1		SRO								
000026 Loss of Component Cooling Water / 8						2.4.4	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. 2.4.47	3.4	1		RO								
000027 Pressurizer Pressure Control System Malfunction / 3			3.03				Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Actions contained in EOP for Pzr PCS malfunctions.	3.7	1	1024	RO					X		X	
000029 ATWS	1.01						Knowledge of the operational implications of the following concepts as they apply to the ATWS: Reactor nucleonics and thermo-hydraulics behavior.	2.8	1		RO								
000029 ATWS					2.02		Ability to determine or interpret the following as they apply to a ATWS: Reactor trip alarm	4.2	1	1035	SRO					X			X
000038 Steam Generator Tube Rupture / III	1.02						Knowledge of the operational implications of the following concepts as they apply to the SGTR: Leak rate vs. pressure drop	3.2	1		RO								
000040 W/E12 Steam Line Rputure- Excessive Heat Transfer / 4			3.01				Knowledge of the reason for the following responses as they apply to the Steam Line Rupture: Operation of steam line isolation valves	4.2	1	1028	RO					X	X		
000040 W/E12 Steam Line Rupture - Excessive Heat Transfer / 4				1.30			(W/E12) Ability to operate and or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators) Desired operating results during abnormal and emergency situations.	3.4	1	593.1	RO			X				X	
000040 W/E12 Steam Line Rupture - Excessive Heat Transfer / 4					2.10		(W/E12) Ability to determine and interpret the following as they apply to the (Uncontrolled Depressurization of all Steam Generators) Facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.2	1	1037	SRO					X		X	
000054 Loss of Main Feedwater / IV					2.04		Ability to determine and interpret the following as they apply to the Loss of Main Feedwater: Proper operation of AFW pumps and regulating valves.	4.2	1	966.1	SRO					X		X	
000055 Station Blackout / 6				1.02			Ability to operate and monitor the following as they apply to a Station Blackout: Manual ED/G start.	4.3	1	1036	RO					X	X		
000056 Loss of Offsite Power / 6	1.04						Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of saturation conditions, implications for the systems.	3.1	1		RO								

000056 Loss of Offsite Power / 6						2.3	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Transient trend of coolant temperature toward no-load Tave.	4.3			SRO									
000057 Loss of Vital AC Inst Bus / 6							Deselected													
000058 Loss of DC Power / 6	1.01						Knowledge of the operational implications of the following concepts at they apply to Loss of DC Power: Battery charger equipment and instrumentation	2.8	1		RO									
000062 Loss of Nuclear Service Water / 4						2.02	Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible SES loss	3.6	1	894.1	SRO			X				X		
000065 Loss of Instrument Air / 8							Deselected													
W/E04 LOCA Outside Containment	1.10						Knowledge of the operational implicatoins of the following concepts as they apply to the (LOCA Outside Containment): Components, capacity, and function of emergency systems.	3.5	1		RO									
W/E04 LOCA Outside Containment		2.10					Containment) and the following: Compontents, and functions of control and safety systems, including instrumentation, signal, interlocks failure modes , and automatic and manual features.	3.5	1		RO									
W/E11 Loss of Emergency Coolant Recirc / 4						2.10	Ability to determine and interpret the following as they apply to the (Loss Of Emergency Coolant Recirculation) Facility conditions and the selection of appropriate procedures during abnormal and emergency operations.	3.4	1	1033	SRO					X				X
W/E05 Inadequate Heat Sink/Loss of Secondary Heat Sink / 4						2.1.2	Ability to determine Mode of Operation	2.8	1		RO									
K/A Category Totals:							Group Point Total:													

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Level	Bank Question	Lesson Plan	Source Information: NRC	Bank	Mod	New	Memory	Comp	Analysis
000001 Continuous Rod Withdrawal / 1							Deselected												
000003 Dropped Control Rod / 1	1.07						Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Effect of dropped rod on insertion limits and SDM.	3.1	1	RO	1029					X		X	
000005 Inoperable/Stuck Control Rod /1							Deselected												
000024 Emergency Boration / 1							Deselected												
000028 Pressurizer Level Malfunction / 2					2.09		Ability to operate and/or monitor the following as they apply to the Pressurizer Level Control Malfunctions: Charging and letdown flow capacities	3.2	1	SRO	902.1			X				X	
000032 Loss of Source Range NI / 7							Deselected												
000033 Loss of Intermediate Range NI / 7							Deselected												
000036 Fuel Handling Accident / 8					2.03		Ability to determine and interpret the following as they apply to the Fuel-handling Incidents: Magnitude of potential radioactive release	3.1	1	SRO									
000037 Steam Generator Tube Leak							Deselected												
000051 Loss of Condenser Vacuum / IV			3.01				Knowledge for the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capacity upon loss of condenser vacuum.	2.8	1	RO	373.1			X				X	
000051 Loss of Condenser Vacuum / IV				1.04			Ability to operate and/or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.	2.5	1	RO	963.1			X				X	
000059 Accidential Liquid Rad/Waste Rel / 8							Deselected												
000060 Accidential Gaseous Radwaste Rel / 8						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	SRO									
000061 ARM System Alarms / 7							Deselected												
000067 Plant Fire On-site / 8			3.02				Knowledge of the reason for the following responses as they apply to the Plant Fire on Site: Steps called out in the site fire protection plan, FPS manual, and fire zone manual.	2.5	1	RO									
000068 Control Room Evac / 8					2.04		Ability to determine and interpret the following as they apply to the Control Room Evacuation: S/G Pressure	3.7	1	RO	1034					X		X	
000069 (W/E14) Loss of CTMT Integrity / V							Deselected												
000074 (W/E06&E07) Inad. Core Cooling / IV					2.10		(E07) Ability to determine and interpret the following as they apply to the (Saturated Core Cooling): Facility conditions and selection of appropriate procedures during abnormal and emergency conditions	4.0	1	SRO	776.1			X			X		
000076 High Reactor Coolant Activity / 9							Deselected												

W/E01 & E02 Rediagnosis & SI Termination	1.20						concepts as they apply to the: Normal, abnormal and emergency operating procedures associated with (Reactor Trip or Safety Injection/Rediagnosis)	3.4	1	RO	195.5			X			X		
WE01 & E02 Rediagnosis & SI Termination		2.20					and the following: Facility's heat removal systems, including primary coolant, emergency coolant, decay heat removal, and relations between the proper operating of these systems to the operation of the	3.5	1	RO										
W/E13 Steam Generator Over-pressure / 4							Deselected													
W/E15 Containment Flooding						2.1.7	Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	1	RO	891.2			X			X		
W/E16 High Containment Radiation / 9					2.10		Ability to determine and interpret the following as they apply to the (High Containment Radiation): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.9	1	SRO	1042					X			X
BW/A01 Plant Runback / 1							Deselected													
BW/A02 & A03 Loss of NNI / 7							Deselected													
BW/A04 Turbine Trip / 4							Deselected													
BW/A05 Emergency Diesel Actuation / 6							Deselected													
BW/A07 Flooding							Deselected													
BW/E03 Inadequate Subcooling Margin / 4							Deselected													
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							Deselected													
BW/E09; CE/A13;W/E9&10 Natural Circ. / 4		2.10					Operations) and the following: Components, and functions of control and safety features, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.2	1	RO	911.1			X			X		
BW/E13&14 EOP Rules and Enclosures							Deselected													
CE/A11; W/E08 RCS Overcooling - PTS / 4							Deselected													
CE/A16 Excess RCS Leakage / 2							Deselected													
CE/E09 Functional Recovery							Deselected													
K/A Category Totals:	4	1	5	3	8	3	Group Point Total:	24	24	10 SRO	6		0	0	0	0	0	0	0	0

24 Sampled
24 Target Sample

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Plant Systems - Tier 2 Group 1

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)	Imp.	Points	Level	Bank Question	Lesson Plan	Source Information: NRC	Bank	Mod	New	Memory	Comp	Analysis
003 Reactor Coolant Pump						6.04						Knowledge of the effect of a loss or malfunction on the following will have on the RCPS: Containment isolation vlaves affecting RCP operation.	2.8	1	RO	1030					X	X		
003 Reactor Coolant Pump									3.03			Ability to monitor automatic operation of the RCPS, including: Seal D/P	3.2	1	RO	977.1			X				X	
004 Chemical Volume and Control	1.16											Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: Boric acid storage tank.	3.3	1	RO	1050					X			X
005 Residual Heat Removal						6.03						*Knowledge of the effect of a loss or malfunction on* the following will have on the RHRS: RHR heat exchanger.	2.5	1	RO	1047					X	X		
006 Emergency Core Cooling			3.01									Knowledge of the effect that a loss or malfunction of the ECCS will have on the following: RCS	4.1	1	RO	1046					X	X		
006 Emergency Core Cooling											2.2	Knowledge of the process for determining if the proposed change, test, or experiment involves an unreviewed safety question.	3.2		SRO									
007 Pressurizer Relief/Quench Tank								2				(A2.02) Ability to predict impacts of the following malfunctions or operatons on P S: and (b) based on those predicitons, use procedures to correct, control, etc., Abnormal pressure in the PRT	2.6	1	RO	617.2			X			X		
008 Component Cooling Water										4.06		Ability to manually operate and/or monitor in the control room: Remote operation of hand-operated throttle valves to regulate CCW flow rate.	2.50	1	RO									
010 Pressurizer Pressure Control					5.01							Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables.		1	RO	311.20			X					X
010 Pressurizer Pressure Control											2.1.3	(2.1.31) Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	4.20	1	RO	164.20			X				X	
012 Reactor Protection					5.01							Knowledge of the operational implications of the folloiwng concepts as they apply to the RPS: DNB	3.30	1	RO	48.10			X			X		
012 Reactor Protection			3.02									Knowledge of the effect that a loss or malfunction of the RPS will have on the following: T/G	3.20	1	RO	107.10			X				X	
013 Engineered Safety Features Actuation				4.11								Knowledge of design feature(s) and/or interlock(s) which provide for...Vital power load control	3.2	1	RO	548.1			X			X		
022 Containment Cooling		2.01										Knowledge of the power supplies to the following: Containment cooling fans.	3.0	1	RO	957.1			X			X		
022 Containment Cooling											2.1	(2.1.12) Ability to apply Technical Specifications	3.4	1	SRO	1054					X		X	
025 Ice Condenser			3.01									Knowledge of the effect that a loss or malfunction of the ice condenser system will have on the following: Containment	3.8	1	RO	1039					X		X	
025 Ice Condenser											2.2.2	(2.2.22) Knowledge of limiting conditions for operations	3.8	1	SRO	40.1			X			X		
026 Containment Spray											2.4.5	*(2.4.50) Ability to verify system alarm setpoints and operate controls* identified in the alarm response manual.	3.3	1	RO	1051					x			x
039 Main and Reheat Steam							1.09					Ability to predict and/or monitor changes in paramets associated with oerating the MRSS controls inluding: Main steamline radiation monitors.	2.5	1	RO	605.1			X				X	

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039 Main and Reheat Steam									4.04		Ability to manually operate and/or monitor in the control room: Emergency feedwater pump turbines.	3.8	1	RO	1032					X		X	
056 Condensate							2.04				Loss of condensate pumps.	2.6	1	RO	532.1			X			X		
059 Main Feedwater				4.02							Knowledge of the MFW design feature(s) and/or interlock(s) which provide for	3.30	1	RO	1031.00					X		X	
061 Auxiliary/Emergency Feedwater					5.01						Knowledge of the operational implications of the following concepts as they apply to the AFW: Relationship between AFW flow and RCS heat transfer	3.6	1	RO									
062 AC Electrical Distribution	1.03										Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the following systems: DC distribution.	3.5	1	RO	1038					X	X		
063 DC Electrical Distribution							1.01				Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate.	2.5	1	RO	906.1			X			X		
064 Emergency Diesel Generator				4.02							Knowledge of ED/G design features and or interlock(s) which provide for: Trips for ED/G while operating (normal or emergency)		1	RO	1048					x	x		
064 Emergency Diesel Generator									4.07		Ability to manually operate and/or monitor in the control room: Transfer ED/G with load to grid.	4.0	1	RO	1049					x	x		
073 Process Radiation Monitoring								2.02			Ability to predict the impacts of the following malfunctions or operations on the *PRM system.....Detector failure.*	2.7	1	RO	671.3			x					X
076 Service Water							1.02				Ability to predict and/or monitor changes in parameters associated with operating the SWS controls including: Reactor and turbine building closed cooling water temperatures	2.6	1	RO									
078 Instrument Air				4.01							Knowledge of IAS design feature(s) and /or interlock(s) which provide for the following: *Manual/automatic transfers of control.*	2.7	1	RO	451.1			X			X		
103 Containment								2.01			Ability to predict the impacts of the following malfunctions operations on the containment system and based on the predictions... Integrated leak rate test	2.6	1	SRO									
103 Containment									3.01		Ability to monitor automatic operation of the containment system, including: Containment isolation.	3.9	1	*RO*	162.1			x			x		
K/A Category Totals:	3	1	3	5	1	0	0	0	1	3	2	Group Point Total:	19	19	1 SRO	4		0	0	0	0	0	0	0

ES-401 — PWR Examination Outline — Form ES-401-3

Plant Systems - Tier 2 Group 2

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)	Imp.	Points	Level	Bank Question	Source Information: NRC	Bank	Mod	New	Memory	Comp	Analysis
001 Control Rod Drive		2.05										Knowledge of the bus power supplies to the following: M/G sets	3.1	1	RO	1040				X	X		
002 Reactor Coolant						6.06						Knowledge of the effect or a loss or malfunction on the following RCS components: Sensors and Detectors	2.5	1	RO	1043				X		X	
011 Pressurizer Level Control												Deselected											
014 Rod Position Indication										4.02		Ability to manually operate and/or monitor in the control room: Control rod mode-select switch.	3.4	1	RO	1044				X	X		
015 Nuclear Instrumentation			3.03									Deselected											
016 Non-nuclear Instrumentation					5.01							Knowledge of the operational implication of the following concepts as they apply to the NNIS: Separation of control and protection circuits.	2.7	1	RO								
017 In-core Temperature Monitor										3.01		Ability to monitor automatic operaton of the ITM system including: Indications of normal, natural, and interrupted circulaton of the RCS.	3.6	1	RO	911.1		X			X		
027 Containment Iodine Removal	1.01											Knowledge of the physical connections and/or cause-effect relatoinships between the CIRS and the following systems: CSS	3.4	1	RO								
028 Hydrogen Recombiner and Purge Control		2										(2.01) Knowledge of bus power supplies to the following: Hydrogen recombiners	2.5	1	RO	1041				X	X		
029 Containment Purge				4.02								Knowledge of design feature(s) and/or interlock(s) which provide for the following: Negative pressure in containment.	2.9	1	RO	28.1		X				X	
033 Spent Fuel Pool Cooling								2.02				Ability to predict the impacts of the following malfunctions or operations: Loss of SFPCS	3.3	1	SRO	892.3		X				X	
034 Fuel Handling Equipment												Deselected											
035 Steam Generator												Deselected											
041 Steam Dump/Turbine Bypass Control											2.4.2	(2.4.20) Knowledge of operational implication of EP warnings, cautions, and notes.	3.3	1	SRO								
045 Main Turbine Generator												Deselected											
055 Condenser Air Removal			3.01									Knowledge of the effect that a loss or malfunction of the CARS will have on the following: Main condenser	2.5	1	RO	547.2		X				X	
068 Liquid Radwaste												Deselected											
071 Waste Gas Disposal												Deselected											
072 Area Radiation Monitoring									3.01			Ability to monitor automatic operation of the ARM system including: Changes in ventilation alignment	2.9	1	RO	976.1		X			X		

075 Circulating Water											Deselected											
079 Station Air											Deselected											
086 Fire Protection											Deselected											
K/A Category Totals:	1	0	2	0	1	2	4	3	2	1	1	Group Point Total:	19	17	2 SRO	4	0	0	0	0	0	0	0

21 SRO systems - 17 SRO K/As
20? RO K/As are imported
Randomly delete 3? SRO K/As - make RO only

17 Sampled
17 Target Sample

ES-401 Generic Knowledge and Abilities Outline (Tier 3) Form ES-401-5

Facility: McGuire		Date of Exam: 6/30/2003	Exam Level:			Bank	Lesson	Source Information						
Category	K/A #	Topic	Imp.	Points	Level	Question	Plan	NRC	Bank	Mod	New	Memory	Comp	Analysis
Conduct of Operations	2.1.10	Knowledge of conditions and limitations in the facility license	4	1	SRO	991.1			X			X		
	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1	SRO	697.2			X				X	
	2.1.32	Ability to explain and apply all system limits and precautions	3.4	1	RO	330.1			X			X		
	2.1.3	Knowledge of shift turnover practices.	3	1	RO	984.1			X			X		
	Total													
Equipment Control	2.2.3	Knowledge of the design, procedural, and operational differences between units.	3.3	1	SRO									
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1	SRO	1004.1			X			X		
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4	1	RO									
	2.2.27	Knowledge of the refueling process	2.6	1	RO	228.1			X			X		
	Total													
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.9	1	SRO	124.1			X				X	
	2.3.9	Knowledge of the process for performing a containment purge	2.5	1	RO	432.2			X				X	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1	RO	1012.1			X				X	
	2.3.11	Ability to control radiation releases.	2.7	1	RO									
	Total													
Emergency Procedures and Plan	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	3.6	1	SRO	338.1			X			X		
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4	1	SRO									
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3	1	RO									
	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	2.8	1	RO	51.1			X			X		
	2.4.34	Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications.	3.8	1	RO	1045					X	X		
	Total		4											
		Tier 3 Point Total	17											

Randomly add 4 K/As that will be SRO only.

17 SRO K/As to be sampled - 13 will be imported from the RO generic section