

Final Submittal

**MCGUIRE FEB 2005 EXAM
50-369 & 370/2005-301**

**FEBRUARY 7 - 15, 2005
FEBRUARY 18, 2005 (written)**

FINAL SAMPLE PLANS / OUTLINES

Facility: McGuire Nuclear Station

Printed: 03/16/2005

Date Of Exam: 02/17/2004

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

Note:

1. Ensure that at least two topics from every 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 the SRO sampling.
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category /tier.
- 6.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals for each system and category. Enter the group and tier totals for each category in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams. basis of plant-specific priorities. Enter the tier totals for each category in the table above.
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.

PWR RO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1				X			EA1.05 - Nuclear instrumentation	4.0	1
000008 Pressurizer Vapor Space Accident / 3					X		AA2.20 - The effect of an open PORV on code safety, based on observation of plant parameters	3.4	1
000009 Small Break LOCA / 3			X				EK3.14 - Monitoring RCP lower bearings	3.1	1
000011 Large Break LOCA / 3		X					EK2.02 - Pumps	2.6*	1
000015/000017 RCP Malfunctions / 4						X	2.1.12 - Ability to apply technical specifications for a system.	2.9	1
000026 Loss of Component Cooling Water / 8						X	2.4.3 - Ability to identify post-accident instrumentation.	3.5	1
000027 Pressurizer Pressure Control System Malfunction / 3			X				AK3.04 - Why, if PZR level is lost and then restored, that pressure recovers much more slowly	2.8	1
000029 ATWS / 1	X						EK1.01 - Reactor nucleonics and thermo-hydraulics behavior	2.8	1
000038 Steam Gen. Tube Rupture / 3				X			EA1.35 - Steam dump condenser	3.5	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4		X					AK2.02 - Sensors and detectors	2.6*	1
000054 Loss of Main Feedwater / 4			X				AK3.03 - Manual control of AFW flow control valves	3.8	1
000055 Station Blackout / 6				X			EA1.05 - Battery, when approaching fully discharged	3.3	1
000058 Loss of DC Power / 6					X		AA2.01 - That a loss of dc power has occurred; verification that substitute power sources have come on line	3.7	1
000065 Loss of Instrument Air / 8					X		AA2.06 - When to trip reactor if instrument air pressure is decreasing	3.6*	1
W/E04 LOCA Outside Containment / 3		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	3.8	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	X						EK1.1 - Components, capacity, and function of emergency systems	3.8	1
W/E11 Loss of Emergency Coolant Recirc. / 4	X						EK1.1 - Components, capacity, and function of emergency systems	3.7	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4						X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	3.5	1
K/A Category Totals:	3	3	3	3	3	3		Group Point Total:	18

PWR RO Examination Outline

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Facility: McGuire Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000001 Continuous Rod Withdrawal / 1						X	2.1.10 - Knowledge of conditions and limitations in the facility license.	2.7	1
000003 Dropped Control Rod / 1	X						AK1.11 - Long-range effects of core quadrant power tilt	2.5	1
000037 Steam Generator Tube Leak / 3					X		AA2.10 - Tech-Spec limits for RCS leakage	3.2	1
000060 Accidental Gaseous Radwaste Rel. / 9		X					AK2.01 - ARM system, including the normal radiation-level indications and the operability status	2.6	1
W/E01 Rediagnosis / 3			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.5	1
W/E03 LOCA Cooldown - Depress. / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with LOCA Cooldown and Depressurization	3.6	1
W/E07 Inad. Core Cooling / 4						X	2.1.25 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	2.8	1
W/E10 Natural Circ. / 4				X			EA1.2 - Operating behavior characteristics of the facility	3.6	1
W/E15 Containment Flooding / 5			X				EK3.1 - Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics	2.7	1
K/A Category Totals:	2	1	2	1	1	2		Group Point Total:	9

PWR RO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

Plant Systems - Tier 2 / Group 1

ES - 401

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
003 Reactor Coolant Pump	X											K1.03 - RCP seal system	3.3	1
004 Chemical and Volume Control								X				A2.19 - High secondary and primary concentrations of chloride, fluoride, sodium and solids	2.8	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								K4.21 - Bypassing/blocking ESF channels	4.1	1
007 Pressurizer Relief/Quench Tank					X							K5.02 - Method of forming a steam bubble in the PZR	3.1	1
007 Pressurizer Relief/Quench Tank											X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.0	1
008 Component Cooling Water							X					A1.03 - CCW pressure	2.7	1
008 Component Cooling Water											X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
010 Pressurizer Pressure Control						X						K6.02 - PZR	3.2	1
012 Reactor Protection							X					A1.01 - Trip setpoint adjustment	2.9*	1
013 Engineered Safety Features Actuation						X						K6.01 - Sensors and detectors	2.7*	1
013 Engineered Safety Features Actuation										X		A4.03 - ESFAS initiation	4.5	1
022 Containment Cooling		X										K2.01 - Containment cooling fans	3.0*	1
025 Ice Condenser								X				A2.03 - Opening of ice condenser doors	3.0*	1
026 Containment Spray								X				A2.02 - Failure of automatic recirculation transfer	4.2*	1
039 Main and Reheat Steam	X											K1.07 - AFW	3.4*	1
059 Main Feedwater									X			A3.06 - Feedwater isolation	3.2*	1
059 Main Feedwater									X			A3.07 - ICS	3.4*	1
061 Auxiliary/Emergency Feedwater		X										K2.03 - AFW diesel driven pump	4.0*	1
062 AC Electrical Distribution				X								K4.01 - Bus lockouts	2.6	1
063 DC Electrical Distribution			X									K3.02 - Components using DC control power	3.5	1

PWR RO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
064 Emergency Diesel Generator			X									K3.02 - ESFAS controlled or actuated systems	4.2	1
064 Emergency Diesel Generator											X	A4.03 - Synchroscope	3.2	1
073 Process Radiation Monitoring	X											K1.01 - Those systems served by PRMs	3.6	1
076 Service Water			X									K3.02 - Secondary closed cooling water	2.5*	1
078 Instrument Air				X								K4.01 - Manual/automatic transfers of control	2.7	1
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	1
103 Containment											X	2.4.2 - Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. Note: The issue of setpoints and automatic safety features is not specifically covered in the systems sections.	3.9	1
K/A Category Totals:	3	2	3	3	2	2	3	3	2	2	3	Group Point Total:	28	

PWR RO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001 Control Rod Drive											X	2.4.43 - Knowledge of emergency communications systems and techniques.	2.8	1
002 Reactor Coolant					X							K5.16 - Reason for automatic features of the Feedwater control system during total loss of reactor coolant flow	3.5	1
015 Nuclear Instrumentation				X								K4.09 - Redundant sources of information on axial flux density distribution	2.8	1
017 In-core Temperature Monitor			X									K3.01 - Natural circulation indications	3.5*	1
029 Containment Purge							X					A1.03 - Containment pressure, temperature, and humidity	3.0*	1
034 Fuel Handling Equipment						X						K6.02 - Radiation monitoring systems	2.6	1
045 Main Turbine Generator										X		A4.08 - RCS parameters (temperature and pressure), while conducting valve freedom test	2.7*	1
072 Area Radiation Monitoring	X											K1.01 - Plant ventilation systems	3.1*	1
075 Circulating Water		X										K2.03 - Emergency/essential SWS pumps	2.6*	1
086 Fire Protection								X				A2.03 - Inadvertent actuation of the FPS due to circuit failure or welding	2.7	1
K/A Category Totals:	1	0	1	1	Group Point Total:	10								

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

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Facility: McGuire Nuclear Station

Form ES-401-3

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
Conduct of Operations	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	2.9	1
	2.1.22	Ability to determine Mode of Operation.	2.8	1
	Category Total:			3
Equipment Control	2.2.26	Knowledge of refueling administrative requirements.	2.5	1
	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.	2.8	1
	Category Total:			2
Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	2.3.11	Ability to control radiation releases.	2.7	1
	Category Total:			3
Emergency Procedures/Plan	2.4.9	Knowledge of low power /shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.3	1
	2.4.10	Knowledge of annunciator response procedures.	3.0	1
	Category Total:			2

Generic Total: 10

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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*	
1. Emergency & Abnormal Plant Evolutions	1	0	0	0				0	0			0	0	0	0	3	3	6
	2	0	0	0				0	0			0	0	0	0	3	1	4
	Tier Totals	0	0	0				0	0			0	0	0	0	6	4	10
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	5
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8
3. Generic Knowledge And Abilities Categories				1		2		3		4		0		1	2	3	4	7
				0		0		0		0				2	1	2	2	

Note:

1. Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the "Tier Totals" in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding the SRO sampling.
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category /tier.
- 6.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals for each system and category. Enter the group and tier totals for each category in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams. basis of plant-specific priorities. Enter the tier totals for each category in the table above.
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.

PWR SRO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000008 Pressurizer Vapor Space Accident / 3						X	2.4.5 - Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	3.6	1
000022 Loss of Rx Coolant Makeup / 2					X		AA2.01 - Whether charging line leak exists	3.8	1
000056 Loss of Off-site Power / 6						X	2.4.36 - Knowledge of chemistry / health physics tasks during emergency operations.	2.8	1
000056 Loss of Off-site Power / 6						X	2.2.20 - Knowledge of the process for managing troubleshooting activities.	3.3	1
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.14 - That substitute power sources have come on line on a loss of initial ac	3.6	1
000062 Loss of Nuclear Svc Water / 4					X		AA2.02 - The cause of possible SWS loss	3.6	1
K/A Category Totals:	0	0	0	0	3	3	Group Point Total:	6	

PWR SRO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000068 Control Room Evac. / 8					X		AA2.06 - RCS pressure	4.3	1
000076 High Reactor Coolant Activity / 9					X		AA2.04 - Process effluent radiation chart recorder	3.0	1
W/E09 Natural Circ. / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.8	1
W/E16 High Containment Radiation / 9						X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
K/A Category Totals:	0	0	0	0	3	1	Group Point Total:	4	

PWR SRO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

Plant Systems - Tier 2 / Group 1

Form ES-401-2

ES - 401

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
003 Reactor Coolant Pump											X	2.1.11 - Knowledge of less than one hour technical specification action statements for systems.	3.8	1
005 Residual Heat Removal											X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	3.3	1
026 Containment Spray								X				A2.04 - Failure of spray pump	4.2	1
061 Auxiliary/Emergency Feedwater								X				A2.02 - Loss of air to steam supply valve	3.6*	1
073 Process Radiation Monitoring								X				A2.02 - Detector failure	3.2	1
K/A Category Totals:	0	3	0	0	2	Group Point Total:	5							

PWR SRO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

Plant Systems - Tier 2 / Group 2

Form ES-401-2

ES - 401

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
016 Non-nuclear Instrumentation											X	2.1.20 - Ability to execute procedure steps.	4.2	1
028 Hydrogen Recombiner and Purge Control								X				A2.03 - The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment	4.0	1
079 Station Air								X				A2.01 - Cross-connection with IAS	3.2	1
K/A Category Totals:	0	2	0	0	1	Group Point Total:	3							

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: 03/16/2005

Facility: McGuire Nuclear Station

Form ES-401-3

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
Conduct of Operations	2.1.5	Ability to locate and use procedures and directives related to shift staffing and activities.	3.4	1
	2.1.12	Ability to apply technical specifications for a system.	4.0	1
	Category Total:			2
Equipment Control	2.2.3	(multi-unit) Knowledge of the design, procedural, and operational differences between units.	3.3	1
	Category Total:			1
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	Category Total:			2
Emergency Procedures/Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4.0	1
	2.4.30	Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1
	Category Total:			2
Generic Total:				7

Tier / Group	Randomly Selected K/A	Reason for Rejection
		The random selection for the McGuire 2005 NRC examination was done using the WOG K&A Developer Program. The sample plan that was developed randomly selected 13 K&As that were on the McGuire 2002 and 2003 NRC exams. After discussions with Lee Miller the Chief Examiner for the 2005 NRC exam it was decided that 8 of the K&As should be replaced by a random process. Using random.org 13 numbers were generated at random. The first eight K&As were to be the K&As that would be changed. In order not to change the sample distribution repeat K&As on ITM and Station Air were not replaced due to only 1 KA I the group. The next two numbers were chosen instead. Also, since there are only 11 K&As in section 3 of the Generic Part of the catalog it became necessary to change one of the RO Generic KAs to section 2. This was also selected randomly. The following 8 KAs were changed for the above reason. It was decided that one of the KAs that was reselected would have a new question written.
1/1	000029 EK1.01	Changed to EK1.05 duplicate from 2003 exam
2/1	078 K4.01	Changed to K4.02 duplicate from 2002 exam
3	2.2.3 SRO	Changed to 2.2.10 duplicate from 2003 exam
3	2.2.34 RO	Changed to 2.2.23 duplicate from 2004 exam
3	2.3.1 SRO	Changed to 2.3.9 duplicate from 2002 exam
3	2.3.4 RO	Changed to 2.3.1 duplicate from 2002 exam
3	2.3.9 RO	Changed to 2.3.2 duplicate from 2003 exam
3	2.3.11 RO	Changed to 2.2.30 duplicate from 2003 exam
1/1	0000056/ 2.4.36	Changed to 2.4.41 There are not Chemistry/Health Physics tasks during a loss of offsite power that involve operations
1/1	000026/ 2.4.3	Changed to 2.4.11. There are not post accident instruments for component cooling at McGuire
1/2	000076 2.04	Changed to 2.02. McGuire has no process effluent radiation chart recorder for reactor coolant
1/2	WE/16 2.1.33	Changed to 2.1.12. At McGuire there are no entry level technical specifications for high containment radiation
1/2	WE/01 EK3.3	Changed to EK 3.2. There are no controls manipulated during the use of the Rediagnosis procedure.
2/2	079 A2.01	Changed to System 033. A 2.03 At McGuire there is no interaction between station air and instrument air.
2/1	059 A3.07	Changed to 3.02. McGuire does not ICS.
2/1	061 K2.03	Changed to K2.02. McGuire does not have a diesel driven AFW pump.
2/2	086 A2.03	Changed to A2.01. Welding will have no effect on FPS.

2/1	013 K601	Changed to 035 A3.01. Did not want to have three 013s in the RO exam.
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PWR Examination Outline																		
Emergency and Abnormal Plant Evolutions - Tier 1 (Group 1)																		
EAPE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	KA Topic(s)	Imp. Points	Question	Level	Lesson Plan	Source Information				Memory	Comp	Analysis
000007 Reactor Trip - Stabilization - Recovery / 1				1.05			Ability to operate and monitor the following as they apply to a reactor trip: Nuclear instrumentation	4.0	1090	RO		X						X
000008 Pressurizer Vapor Space Accident / III					2.20		Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: The effect of an open PCHV on core safety, based on observed plant parameters, or per G Tasks S-29-04	3.4	1091	RO			X					X
000009 Pressurizer Vapor Space Accident / III						2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	3.6	1166	SFO				X				X
000009 Small Break LOCA / III				3.14			Knowledge of the reason for the following responses as they apply to the small break LOCA: Monitoring RCP lower bearings	3.1	1092	RO				X				X
000011 Large Break LOCA / 4				2.02			Knowledge of the interrelations between the and the following Large Break LOCA: Pumps	2.6	1093.00	RO		X						X
000015/17 RCP Malfunctions / 4						2.1.1	(2.1.12) Ability to apply technical specifications for a system	2.90	1094.00	RO				X				X
000022 Loss of Reactor Coolant Makeup / II					2.01		Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: Whether charged line leak exists.	3.2	1166	SFO				X				X
000025 Loss of RHH System / IV							Disselected											
000026 Loss of Component Cooling Water / 8						2.4.1	(2.4.11) Knowledge of abnormal condition procedures.	3.4	1095	RO				X				X
000027 Pressurizer Pressure Control System Malfunction / 3				3.04			Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Why, if PZT level is lost and then restored, that pressure recovers much more slowly	2.8	1096	RO				X				X
000029 ATWS				1.05			Knowledge of the operational implications of the following concepts as they apply to the ATWS: definition of negative temperature coefficient as applied to large PWR coolant systems	2.8	1097	RO				X				X
000038 Steam Generator Tube Rupture / III					1.35		Ability to operate and monitor the following as they apply to a SGTR: Steam dump condenser	3.5	1098	RO				X				X
000040 W/E12 Steam Line Rupture- Excessive Heat Transfer / 4				2.02			Knowledge of the interrelations between the Steam Line Rupture and the following: Sensors and detectors.	2.6	1099	RO			X					X
000054 Loss of Main Feedwater / IV				3.03			Knowledge of the reason for the following responses as they apply to the Loss of Main Feedwater: Manual control of AFW flow control valves.	3.8	1100	RO				X				X
000055 Station Blackout / 6				1.05			Ability to operate and monitor the following as they apply to a Station Blackout: Battery, when approaching fully discharged.	3.3	1101	RO				X				X
000056 Loss of Offsite Power / 6						2.4.4	(2.4.41) Knowledge of emergency action levels thresholds and classifications.	2.8	1168	SFO				X				X
000058 Loss of Offsite Power / 6						2.2.2	(2.2.20) Knowledge of the process for managing troubleshooting activities	3.3	1169	SFO				X				X
000057 Loss of Vital AC Inlet Bus / 6				2.14			Ability to determine and interpret the following as they apply to the Loss of Vital AC Inlet Bus: That substitute power sources have come on line on a loss of vital AC	3.6	1170	SFO				X				X
000058 Loss of DC Power / 8				2.01			(2.01) Ability to determine and interpret the following as they apply to the Loss of DC Power: That a loss of DC power has occurred; verification that substitute power sources have come on line	3.7	1102	RO				X				X

NRC Examination Outline Emergency and Abnormal Plant Conditions - The 14992P.2 1-2007 E-5407.3																		
E/APE # / Name / Safety Function	K/A Topic(s)						Imp.	Points	Level	Question	System References							
	K1	K2	K3	K4	K5	K6					Lesson Plan	NRC	Bank	Mod	New	Memory	Comp	Analysis
000001 Continuous Rod Withdrawal / 1							2.7	1	RO	1108			X				X	
000003 Dropped Control Rod / 1	1.11						2.5	1	RO	1109				X				X
000005 Inoperable/Stuck Control Rod / 1																		
000024 Emergency Boration / 1																		
000028 Pressurizer Level Malfunction / 2																		
000032 Loss of Source Range N1 / 7																		
000033 Loss of Intermediate Range N1 / 7																		
000036 Fuel Handling Accident / 8																		
000037 Steam Generator Tube Leak							3.2	1	RO	1110				X			X	
000051 Loss of Condenser Vacuum / IV																		
000059 Accidental Liquid RadWaste Rel / 8																		
000060 Accidental Gaseous Radwaste Rel / 8							2.6	1	RO	1111				X		X		
000061 ARM System Alarms / 7																		
000067 Plant Fire On-site / 8																		
000068 Point of Reference / 8							4.3	1	SRFO	1112					X			X
000069 (W/IE14) Loss of CTMT Integrity / V																		
000074 (W/IE08&E07) Inad. Core Cooling / IV																		
000075 High Reactor Control Activity / 8							3.4	1	SRFO	1172			X			X		

W/E11 Redesign		3.20			Knowledge of the reasons for the following responses as they apply to the (ix tip or Shift diagnosis), Normal, abnormal and emergency operating procedures associated with (ix tip or SI)	2.0	1	RO	1112				X	X		
W/E12 High Component Failure / 3				2.1.2 Ability to apply technical specifications for a system	4.8	1	SP3	1175					X			X
B/WA01 Plant Runback / 1				Deactivated												
B/WA02 & A03 Loss of NNI / 7				Deactivated												
B/WA04 Turbine Trip / 4				Deactivated												
B/WA05 Emergency Diesel Actuation / 6				Deactivated												
B/WA07 Flooding				Deactivated												
B/WE03 Inadequate Subcooling Margin / 4				Deactivated												
B/WE08: W/E03 LOCA Cooldown - Depress. / 4	1.20			the (LOCA Cooldown and Depressurization), Normal, abnormal and emergency operating procedures associated with LOCA Cooldown and Depressurization.	3.6	1	RO	1113				X				X
W/E07 Inadequate Core Cooling				Ability to obtain and interpret station reference materials such as graphs, runways, and tables which contain performance data.	2.8	1	RO	1114				X				X
W/E09 Nuclear Excursion Operations				Ability to determine and interpret the licensing as they apply to the different scenarios (scenarios) - response to appropriate procedures and operators within the boundaries of the licensee license and approvals.	3.8	1	SP3	1176				X				X
W/E10 Natural Circulation with Steam Void in Vessel with/without RVLS		1.20		Ability to operate and/or monitor the following as they apply to the (Natural Circ with Steam Void in Vessel) : - Operating behavior	3.6	1	RO	1115				X				X
W/E15 Containment Flooding				(Containment Flooding) : Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating irritations and the reason	2.7	1	RO	1116				X				X
K/A Category Totals:				Group Point Total:												

PWR Examination Outline													Form ES-40-1-3												
Plant Systems - Tier 2 Group 2																									
System # / Name	K	K	K	K	K	K	A	A	A	A	A	G	K/A Topic(s)	Imp.	Points	Level	Question	NRC	Bank	Mod	New	Memory	Comp	Analysis	
001 Control Rod Drive													2.4.4 (2.4.4.3) Knowledge of emergency communications systems and techniques	2.8	1	RO	1145				X		X		
002 Reactor Coolant					5.16								Knowledge of the operational implications of the following concepts as they apply to the RCS: Reason for automatic features of the Feedwater control system during total loss of reactor coolant flow.	3.5	1	RO	1146				X			X	
011 Pressurizer Level Control													Deselected												
014 Rod Position Indication													Deselected												
015 Nuclear Instrumentation					4.09								(4.09) Knowledge of NIS design feature(s) and/or function(s) provide for the following: Redundant sources of information on axial flux density distribution	2.8	1	RO	1147				X			X	
018 Non-nuclear Instrumentation													2.1.1 (2.1.20) Ability to execute procedure steps	4.2	1	SPO	1181				X			X	
017 In-core Temperature Monitor					3.01								Knowledge of the effect that a loss or malfunction of the ITM system will have on the following: Natural circulation indications	3.5	1	RO	1148				X			X	
027 Containment Iodine Removal													Deselected												
028 Hydrogen Recombiner and Purge Control													(2.08) Malfunctions or operators in the HFRS and based on those predictions, use procedures to correct, control or mitigate the consequences of these malfunctions or operators: the hydrogen concentration in excess of limit flame propagation.	4.0	1	SPO	1174				X			X	
029 Containment Purge													Ability to predict and/or monitor Changes in parameters to prevent exceeding design limit(s) associated with operating the Containment Purge System controls including: Containment pressure, temperature, and humidity	3.0	1	RO	1149				X			X	
033 Spent Fuel Pool Cooling													(2.03) Abnormal spent fuel pool water level or loss of water level.	3.5	1	SPO	1182				X			X	
034 Fuel Handling Equipment													(6.02) Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System: Radiation monitoring systems	2.6	1	RO	1150				X			X	
035 Steam Generator													Deselected												
041 Steam Dump/Turbine Bypass Control													Deselected												
045 Main Turbine Generator													(4.08) Ability to manually operate and/or monitor in the control room: RCS parameters (temperature and pressure) while conducting valve freedom test	2.7	1	RO	1151				X			X	
055 Condenser Air Removal													Deselected												
068 Liquid Radwaste													Deselected												
071 Waste Gas Disposal													Deselected												
072 Area Radiation Monitoring													Knowledge of the physical connections and/or cause-effect relationships between ATW system and the following systems: Plant Ventilation systems	3.1	1	RO	1152				X			X	

075 Circulating Water	2.03																	(2.03) Knowledge of bus power supplies to the following: Emergency/essential SWS Pumps	2.6	1	RO	1153				X		X
079 Station Air										2.01								Deaerated										
086 Fire Protection										2.01								FPS; and based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operation: Manual shutdown of the FPS.	2.9	1	RO	1154				X		X
K/A Category Totals:	1	0	2	0	1	2	4	3	2	1	1							Group Point Total:	2.9	1								

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Facility: McGuire		Date of Exam: 6/30/2003		Exam Level:											
Category	K/A #	Topic	Imp.	Points	Level	Question	Lesson Plan	NRC	Bank	Mod	New	Memory	Comp	Analysis	
Conduct of Operations	2.1.5	Ability to locate and use procedures and directives relative to shift staffing and activities.	3.4	1	SRO	1183									
	2.1.12	Ability to apply technical specifications for a system.	4	1	SRO	1184			X			X			
	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1	RO	1155			X			X			
Conduct of Operations	2.1.16	Ability to make accurate, clear and concise logs, records, status boards, and reports.	2.9	1	RO	1156					X	X		X	
	2.1.22	Ability to determine Mode of Operation.	2.8	1	RO	1157					X	X			
Equipment Control	2.2.10	Basis of any technical specification is reduced by a proposed change, test or experiment.	3.3	1	SRO	1185			X			X			
	2.2.26	Knowledge of refueling administrative requirements, communication, systems operated from the control room in support of fueling operations, and supporting instrumentation.	2.5	1	RO	1158					X	X			
Equipment Control	2.2.30	Ability to track limiting conditions for operations.	3.5	1	RO	1159			X		X	X			
	2.2.23	Ability to track limiting conditions for operations.	2.6	1	RO	1160					X	X			
Radiation Control	2.3.9	Knowledge of the process of performing a containment purge.	3.4	1	SRO	1186			X				X		
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1	SRO	1187					X	X			
	2.3.1	Knowledge of 10 CFR, 20 and related facility radiation control requirements.	2.5	1	RO	1161			X			X			
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1	RO	1162					X	X			
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4	1	SRO	1188			X					X	
Emergency Procedures and Plan	2.4.30	Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1	SRO	1189			X			X			
	2.4.9	Knowledge of low power/shutdown implications in accident (e.g. LOCA or loss of PHR) mitigation strategies.	3.3	1	RO	1163			X					X	
Emergency Procedures and Plan	2.4.10	Knowledge of annunciator response procedures.	3	1	RO	1164					X	X			
	Totals: RO 10 and SRO 7														
Randomly add 4 KRAs that will be SRO only.															

Facility: McGuire
 Examination Level (circle one): RO SRO

Date of Examination: 2/7-16/05
 Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N	AFD Calculation with inoperability
Conduct of Operations	N,S	Perform a Shift turnover
Equipment Control	M,	Manual NC Leakage Calculation
Radiation Control		
Emergency Plan	N,C	Perform RP/11 Conducting a Site Assembly or Evacuation

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
 (C)ontrol room
 (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
 (N)ew or (M)odified from bank (≥ 1)
 (P)revious 2 exams (≤ 1; randomly selected)
 (S)imulator

Facility: <u>McGuire</u>		Date of Examination: <u>2/7-14/05</u>
Examination Level (circle one): RO / <u>SRO</u>		Operating Test Number: <u>1</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N	AFD Calculation with inoperability determination
Conduct of Operations	M	Shift Manning Requirements
Equipment Control	N	Thermal Margin Calculation and Evaluation of Work Allowed
Radiation Control	M, P, C	Review and Approve a GWR
Emergency Plan	M, C	RP/07 Earthquake with Technical Specification
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: <ul style="list-style-type: none"> (C)ontrol room (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1; randomly selected) (S)imulator 		

Facility: <u>McGuire</u>		Date of Examination: <u>2/7-16/05</u>
Exam Level (circle one): RO <u>SRO-I</u> SRO-U		Operating Test No.: <u>1</u>
Control Room Systems® (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)		
System / JPM Title	Type Code*	Safety Function
a. Respond to a Loss of Component Cooling (KC-234A)	N, S, A	SF-8
* b. Respond to a Leak on operating ND System while at Mid Loop	D, L, P	SF-4P
c. Intermediate Range Failure (ENB-235A) (SROU)	N, S, A	SF-7
d. Align the Containment Spray system to Cold Leg Recirculation (NS-182A) (SROU)	D,S,P,A	SF-5
e. Respond to Additional Dropped Rods While Retrieving a Dropped Control Rod (IRE 174IA)	A, D, S	SF-1
f. Establish Feedwater Flow to S/G's following a Runback (CF-237)	N,S	SF-4S
g. Align Normal Charging With NV Recirc Path Isolated (NV-146A)	A,D, S	SF-2
h. Start and Load 1B D/G then Separate From the Grid (DG-198) (SROU)	D, S	SF-6
In-Plant Systems® (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i. Control Steam Pressure Using SM PORVs (Unit 2) (SM238) (SROU)	E, B	SF-4S
j. Borate the Reactor Coolant System from the Auxiliary Shutdown Panel ASP-138 (SROU)	R, E, B	SF-1
k. Aligning Control Air from Backup Cylinders to F VI Compressor VI-110A)	E, A, P	SF-8
@ All control room (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room	$\leq 9 / \leq 8 / \leq 4$	
(D)irect from bank	$\geq 1 / \geq 1 / \geq 1$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(L)ow-Power	$\geq 2 / \geq 2 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(P)revious 2 exams	$\geq 1 / \geq 1 / \geq 1$	
(R)CA		
(S)imulator		

* N/A SRO-I

Facility: McGuire	Scenario No.: 1	Op-Test No.: _____
Examiners: _____ _____	Operators: _____ _____	
Initial Conditions: 100% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged		
Turnover: Perform Annulus Ventilation System Train A Operability Test		

Event No.	Malf. No.	Event Type*	Event Description
1		N	Annulus Ventilation System Train A Operability Test
2		I	(BOP) 1NV-124 Fails Open
3		I	(RO) Channel 1 Steam Pressure Fails low
4		C	(RO) Control Rod Insertion
5		C	(BOP) PZR Pressure Channel 2 fails HIGH
6		I/C	(BOP) Operating RN pump trips
7		C	(CREW) Steam Leak requiring shutdown
8		M	Steam Break Outside Containment
			MSIVs fail to close on automatic signal – RO closes manually
			No Auto SI
			Phase "A" Train "A" fails to automatically actuate
			"A" Reactor Trip breaker will not open from control room
			"B" S/G MSIV will not close

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: McGuire	Scenario No.: 2	Op-Test No.: _____
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	
Initial Conditions: 100% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged		
Turnover: Maintain present plant conditions		

Event No.	Malfunction No.	Event Type*	Event Description
1		I	(RO) Impulse Pressure Channel 1 Fails LOW
2		C	(BOP) Pressurizer Spray Valves Fails OPEN
3		C	(RO) S/G Feedwater Regulating Valve Failure
4		C	(BOP) 'B' NV pump trips
5		N	(BOP) Establish excess letdown
6		C	(CREW) Small Reactor coolant system leak
7		M	Medium size NC system leak with no high head pumps
			'A' High head pump trips on SI
			No automatic Safety Injection
			'A' ND pump recirculation valve fails closed on SI

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

