

*FINAL REVISION*

Facility:		LGS 2010 SRO				Date of Exam:				10/04/10								
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	A2		G*		Total
1. Emergency & Plant Evolutions	1												20	4		3		7
	2												7	1		2		3
	Tier Totals												27	5		5		10
2. Plant Systems	1												26	3		2		5
	2												12	1	1	1	3	
	Tier Totals												38	5		3		8
3. Generic Knowledge & Abilities Categories					1		2		3		4		10	1	2	3	4	7
											1	2		2	2			

- 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  $\pm 1$  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 section D.1.b of ES-401, for guidance regarding 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 KAs 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. Refer to Section D.1.b of ES-401 for the applicable K/A's
  8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. If fuel handling equipment is sampled in other than Category A2 or G\* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). 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 10CFR55.43

2010 SRO  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295031 Reactor Low Water Level					X		EA2.04 - Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling	4.8	1
295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1					X		EA2.02 - Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Reactor water level	4.2	2
600000 Plant Fire On-site / 8					X		AA2.15 - Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: Requirements for establishing a fire watch	3.5	3
295028 High Drywell Temperature / 5						X	2.2.37 - Equipment Control: Ability to determine operability and / or availability of safety related equipment.	4.6	4
295025 High Reactor Pressure / 3						X	2.4.30 - Emergency Procedures / Plan; Knowledge of events related to system operation / status that must be reported to internal organizations or external agencies, such as the state, the NRC, or the transmission system operator.4.1	4.1	5
295023 Refueling Acc Cooling Mode / 8						X	2.4.11, Knowledge of abnormal condition procedures.	4.2	6
295038 High Off-site Release Rate / 9					X		EA2.04 - Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : Source of off-site release	4.1	7
K/A Category Totals:	0	0	0	0	4	3	Group Point Total:	7	

2010 SRO  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
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295035 Secondary Containment High Differential Pressure / 5					X		EA2.01 - Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Secondary containment pressure: Plant-Specific	3.9	8
295013 High Suppression Pool Temperature / 5						X	2.1.25, Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	9
295014 Inadvertent Reactivity Addition / 1						X	2.4.35 - Emergency Procedures / Plan: Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects.	4.0	10
K/A Category Totals:	0	0	0	0	1	2	Group Point Total:	3	

2010 SRO  
Written Examination Outline  
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		Imp.	Q#
202001 Recirculation System								X				A2.03 Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Single recirculation pump trip	3.7	11
215004 Source Range Monitor								X				A2.02 - Ability to (a) predict the impacts of the following on the SOURCE RANGE MONITOR (SRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: SRM inop condition	3.7	12
217000 RCIC											X	2.4.16, Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.	4.4	13
218000 ADS											X	2.2.40, Ability to apply Technical Specifications for a system.	4.5	14
215003 IRM								X				A2.01 - Ability to (a) predict the impacts of the following on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Power supply degraded	3.2	15
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Point Total:	5	

2010 SRO  
Written Examination Outline  
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		Imp.	Q#
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259001 Reactor Feedwater								X				A2.03 - Ability to (a) predict the impacts of the following on the REACTOR FEEDWATER SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of condensate pump(s)	3.6	16
204000 RWCU											X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	17
234000 Fuel Handling Equipment				X								K4.01 -- Prevention of core alterations during control rod movements	4.1	18
K/A Category Totals:	0	0	0	1	0	0	0	1	0	0	1	Group Point Total:	3	

Facility:		2010 SRO		Date:			
Category	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
1. Conduct of Operations							
	2.1.9	Ability to direct personnel activities inside the control room.			4.5	19	
	Subtotal					1	
2. Equipment Control							
	2.2.6	Knowledge of the process for making changes to procedures.			3.6	20	
	2.2.22	Knowledge of limiting conditions for operations and safety limits.			4.7	23	
	Subtotal					2	
3. Radiation Control							
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	21	
	2.3.11	Ability to control radiation releases.			4.3	24	
	Subtotal					2	
4. Emergency Procedures / Plan							
	2.4.44	Knowledge of emergency plan protective action recommendations.			4.4	22	
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.			4.6	25	
	Subtotal					2	
Tier 3 Point Total				10		7	

FINAL REVISION

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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	A2	G*	Total	
1. Emergency & Plant Evolutions	1	3	4	3				3	4			3	20			7	
	2	2	1	1				1	1			1	7			3	
	Tier Totals	5	5	4				4	5			4	27			10	
2. Plant Systems	1	3	2	3	2	3	2	2	3	2	2	2	26			5	
	2	1	1	2	1	1	1	1	1	1	1	1	12			3	
	Tier Totals	4	3	5	3	4	3	3	4	3	3	3	38			8	
3. Generic Knowledge & Abilities Categories				1		2		3		4		10	1	2	3	4	7
				3		3		2		2							
<p>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).</p> <p>2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by <math>\pm 1</math> from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.</p> <p>3. 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 section D.1.b of ES-401, for guidance regarding elimination of inappropriate K/A statements.</p> <p>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.</p> <p>5. Absent a plant specific priority, only those KAs 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.</p> <p>6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.</p> <p>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. Refer to Section D.1.b of ES-401 for the applicable K/A's</p> <p>8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. If fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.</p> <p>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 10CFR55.43</p>																	

2010 NRC RO  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1	X						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Reactor pressure effects on reactor power	4.1	1
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	X						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Power/flow distribution	3.3	2
295006 SCRAM / 1	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to SCRAM : Reactivity control	3.7	3
295016 Control Room Abandonment / 7		X					AK2.01 - Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: Remote shutdown panel: Plant-Specific	4.4	4
295019 Partial or Total Loss of Inst. Air / 8		X					AK2.05 - Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and the following: Main steam system	3.4	5
295024 High Drywell Pressure / 5		X					EK2.18 - Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Ventilation	3.3	6
295026 Suppression Pool High Water Temp. / 5			X				EK3.01 - Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Emergency/normal depressurization	3.8	7
295005 Main Turbine Generator Trip / 3			X				AK3.05 - Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: Extraction steam/moisture separator isolations	2.5	8
295018 Partial or Total Loss of CCW / 8			X				AK3.03 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : Securing individual components (prevent equipment damage)	3.1	9
295023 Refueling Accidents					X		AA2.02 - Ability to operate and/or monitor the following as they apply to REFUELING ACCIDENTS : Fuel Pool Level	3.4	10
295038 High Off-site Release Rate / 9				X			EA1.04 - Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE: SPDS/ERIS/CRIDS/GDS: Plant-Specific	2.8	11
295028 High Drywell Temperature / 5				X			EA1.01 - Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell spray: Mark-I&II	3.8	12
295021 Loss of Shutdown Cooling / 4					X		AA2.04 - Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : Reactor water temperature	3.6	13
295004 Partial or Total Loss of DC Pwr / 6					X		AA2.04 - Ability to determine and/or interpret the following as they apply to	3.2	14



2010 NRC RO  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
							PARTIAL OR COMPLETE LOSS OF D.C. POWER : System lineups		
295025 High Reactor Pressure / 3					X		EA2.06 - Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Reactor water level	3.7	15
295030 Low Suppression Pool Water Level / 5						X	2.1.23 - Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	16
295003 Partial or Complete Loss of AC / 6						X	2.2.4 - Equipment Control: (multi-unit license) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.	3.6	17
600000 Plant Fire On-site / 8						X	2.4.8 - Emergency Procedures / Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	3.8	18
700000 Generator Voltage and Electric Grid Disturbances				X			AA1.01 - Ability to operate and/or monitor the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Grid frequency and voltage.	3.6	19
295031 Reactor Low Water Level / 2		X					EK2.02 - Knowledge of the interrelations between REACTOR LOW WATER LEVEL and the following: Reactor pressure	3.8	20
K/A Category Totals:	3	4	3	3	4	3	Group Point Total:	20	

2010 NRC RO  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295033 High Secondary Containment Area Radiation Levels / 9	X						EK1.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS : Personnel protection	3.9	21
295035 Secondary Containment High Differential Pressure / 5		X					EK2.04 - Knowledge of the interrelations between SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE and the following: Blow-out panels: Plant-Specific	3.3	22
295009 Low Reactor Water Level / 2			X				AK3.01. Knowledge of the reasons for the following responses as they apply to Recirculation pump run back: Plant-Specific	3.2	23
295036 Secondary Containment High Sump/Area Water Level / 5				X			EA1.03 - Ability to operate and/or monitor the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL : Radwaste	2.8	24
295029 High Suppression Pool Water Level / 5					X		EA2.03 - Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL : Drywell/containment water level	3.4	25
295014 Inadvertent Reactivity Addition / 1						X	2.1.7- Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	26
295012 High Drywell Temperature / 5	X						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE : Reactor power level control	3.1	27
K/A Category Totals:	2	1	1	1	1	1	Group Point Total:		7

2010 NRC RO  
Written Examination Outline  
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		Imp.	Q#
223002 PCIS/Nuclear Steam Supply Shutoff	X											K1.01 - Knowledge of the physical connections and/or cause- effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the following: Main Steam System	3.8	28
264000 EDGs	X											K1.05 - Knowledge of the physical connections and/or cause- effect relationships between EMERGENCY GENERATORS (DIESEL/JET) and the following: Emergency generator fuel oil supply system	3.2	29
203000 RHR/LPCI: Injection Mode		X										K2.02 - Knowledge of electrical power supplies to the following: Valves	2.5	30
300000 Instrument Air		X										K2.01 - Knowledge of electrical power supplies to the following: Instrument air compressor	2.8	31
205000 Shutdown Cooling			X									K3.01 - Knowledge of the effect that a loss or malfunction of the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) will have on following: Reactor pressure	3.3	32
215005 APRM / LPRM			X									K3.01 - Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on following: RPS	4.0	33
215004 Source Range Monitor				X								K4.02 - Knowledge of SOURCE RANGE MONITOR (SRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Reactor SCRAM signals	3.4	34
262001 AC Electrical Distribution				X								K4.05 - Knowledge of A.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the following: Paralleling of A.C. sources (synchroscope)	3.4	35
217000 RCIC					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to REACTOR CORE ISOLATION COOLING SYSTEM (RCIC): Flow indication	3.1	36
211000 SLC					X							K5.07 - Knowledge of the operational implications of the following concepts as they apply to STANDBY LIQUID CONTROL SYSTEM : Tank heater operation	2.7	37

2010 NRC RO  
Written Examination Outline  
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		Imp.	Q#
206000 HPCI						X						K6.11 - Knowledge of the effect that a loss or malfunction of the following will have on the HIGH PRESSURE COOLANT INJECTION SYSTEM : Nuclear boiler instrumentation: BWR-2,3,4	3.6	38
263000 DC Electrical Distribution						X						K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the D.C. ELECTRICAL DISTRIBUTION : A.C. electrical distribution	3.2	39
215003 IRM							X					A1.06 - Ability to predict and/or monitor changes in parameters associated with operating the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM controls including: Lights and alarms	3.3	40
261000 SGTS							X					A1.04 - Ability to predict and/or monitor changes in parameters associated with operating the STANDBY GAS TREATMENT SYSTEM controls including: Secondary containment differential pressure	3.0	41
239002 SRVs								X				A2.02 - Ability to (a) predict the impacts of the following on the RELIEF/SAFETY VALVES ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Leaky SRV	3.1	42
209001 LPCS								X				A2.04 - Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: D.C. failures	2.9	43
212000 RPS									X			A3.02 - Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including: Individual system relay status: Plant-Specific	3.2	44
400000 Component Cooling Water										X		A3.01 - Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3.0	45
218000 ADS											X	A4.03 - Ability to manually operate and/or monitor in the control room: ADS logic reset	4.2	46

2010 NRC RO  
Written Examination Outline  
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		Imp.	Q#
259002 Reactor Water Level Control											X	A4.03 - Ability to manually operate and/or monitor in the control room: All individual component controllers when transferring from manual to automatic modes	3.8	47
262002 UPS (AC/DC)											X	2.2.22 - Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.0	48
262002 UPS (AC/DC)											X	2.1.28 - Knowledge of conduct of operations requirements: Knowledge of the purpose and function of major system components and controls..	4.1	49
262001 AC Electrical Distribution								X				A2.03 - Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of off-site power	3.9	50
211000 SLC			X									K3.02 - Knowledge of the effect that a loss or malfunction of the STANDBY LIQUID CONTROL SYSTEM will have on following: Core spray line break detection system: Plant-Specific	3.0	51
261000 SGTS	X											K1.08 - Knowledge of the physical connections and/or cause- effect relationships between STANDBY GAS TREATMENT SYSTEM and the following: Process radiation monitoring system	2.8	52
215005 APRM / LPRM					X							K5.04 - Knowledge of the operational implications of the following concepts as they apply to AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM : LPRM detector location and core symmetry	2.9	53
K/A Category Totals:	3	2	3	2	3	2	2	3	2	2	2	Group Point Total:	26	

2010 NRC RO  
Written Examination Outline  
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	Imp.	Q#
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215002 RBM	X											K1.02 - Knowledge of the physical connections and/or cause- effect relationships between ROD BLOCK MONITOR SYSTEM and the following: LPRM: BWR-3,4,5	3.2	54
201001 CRD Hydraulic		X										K2.02 - Knowledge of electrical power supplies to the following: Scram valve solenoids	3.6	55
286000 Fire Protection			X									K3.02 - Knowledge of the effect that a loss or malfunction of the FIRE PROTECTION SYSTEM will have on following: Personnel protection	3.2	56
288000 Plant Ventilation				X								K4.02 - Knowledge of PLANT VENTILATION SYSTEMS design feature(s) and/or interlocks which provide for the following: Secondary containment isolation	3.7	57
241000 Reactor/Turbine Pressure Regulator							X					A1.07 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls including: Bypass valve position	3.8	58
226001 RHR/LPCI: CTMT Spray Mode						X						K6.11 - Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE : Component cooling water systems	2.8	59
201003 Control Rod and Drive Mechanism				X								K5.01 Knowledge of the operational implications of the following concepts as they apply to CONTROL ROD AND DRIVE MECHANISM : Hydraulics	2.6	60
272000 Radiation Monitoring								X				A2.07 - Ability to predict the impacts of the following on the RADIATION MONITORING SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Hydrogen injection operation: Plant-Specific	2.8	61
230000 RHR/LPCI: Torus/Pool Spray Mode									X			A3.01 - Ability to monitor automatic operations of the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE including: Valve operation	3.4	62
290003 Control Room HVAC										X		A4.01 - Ability to manually operate and/or monitor in the control room: Initiate/reset system	3.2	63
233000 Fuel Pool Cooling/Cleanup											X	2.4.4, Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.5	64
271000 Off-gas			X									K3.01 - Knowledge of the effect that a loss or malfunction of the OFFGAS SYSTEM will have on following: Condenser vacuum	3.5	65
K/A Category Totals:	1	1	2	1	1	1	1	1	1	1	1	Group Point Total:	12	

Facility:		2010 NRC RO		Date:			
	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
Category	2.1.20	Ability to interpret and execute procedure steps.	4.6	66			
	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	67			
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.1	68			
	Subtotal			3			
	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.	3.9	69			
	2.2.7	Knowledge of the process for conducting special or infrequent tests.	2.9	70			
	2.2.40	Ability to apply technical specifications for a system.	3.4	71			
	Subtotal			3			
	2.3.12	Knowledge of Radiological Safety Principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	72			
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personell monitoring equipment, etc.	2.9	73			
	Subtotal			2			
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.6	74			
	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.5	75			
Subtotal			2				
Tier 3 Point Total				10		7	

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 1/ 2	295014 Inadvertent Reactivity Addition, 2.2.42	<p>2.2.42- Equipment Control: Ability to recognize system parameters that are entry-level conditions for Technical Specifications.</p> <p>Reason for Rejection: There are no entry-level conditions for Technical Specifications for Inadvertent Reactivity Addition.</p> <p>Randomly reselected another item within 295014 G: 2.1.7- Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.</p>
RO 2/1	300000 Instrument Air, K2.02	<p>K2.02 - Knowledge of electrical power supplies to the following: Emergency air compressor</p> <p>Reason for Rejection: Equipment not applicable to LGS</p> <p>Randomly reselected another item within 300000 K2: K2.01 - Knowledge of electrical power supplies to the following: Instrument air compressor</p>
RO 2/1	263000 DC Electrical Distribution, K6.02	<p>K6.02 - Knowledge of the effect that a loss or malfunction of the following will have on the D.C. ELECTRICAL DISTRIBUTION: Battery ventilation</p> <p>Reason for Rejection: Loss of battery ventilation does not result in plant conditions that can be used to develop a discriminating question for a control room operator.</p> <p>Randomly reselected another item within 263000 K6: K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the D.C. ELECTRICAL DISTRIBUTION :A.C. electrical distribution</p>
RO 2/1	262002 UPS (AC/DC), 2.4.21	<p>2.4.21 - Emergency Procedures / Plan: Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.</p> <p>Reason for Rejection: There are no UPS related functions that impact parameters and logic used to assess the status of safety functions.</p> <p>Randomly reselected another item within 262002 G: 2.1.28 - Knowledge of conduct of operations requirements: Knowledge of the purpose and function of major system components and controls.</p>



RO 2/2	272000 Radiation Monitoring, A2.14	<p>A2.14 - Ability to predict the impacts of the following on the RADIATION MONITORING SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of, or inadequate, shielding</p> <p>Reason for Rejection: there are no operations related AOP/EOP procedures for loss of, or inadequate, shielding for a radiation monitoring.</p> <p>Randomly reselected another item within 272000 A2: A2.07 - Ability to predict the impacts of the following on the RADIATION MONITORING SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Hydrogen injection operation: Plant-Specific</p>
SRO 2/1	300000 Instrument Air, A2.01	<p>A2.01 - Ability to (a) predict the impacts of the following on the INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Air dryer and filter malfunctions</p> <p>Reason for Rejection: For air dryer and filter malfunctions, control room personnel take no action to correct, control, or mitigate the consequences other than to dispatch appropriate personnel. All other actions are performed locally.</p> <p>Randomly reselected another item: 300000 A2 only contains 1 item. For this reason randomly selected a different system A2 item: 202001 Recirculation System, A2.03 Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Single recirculation pump trip</p>
RO 1/1	295016 Control Room Abandonment	<p>AK2.03 - Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: Control room HVAC</p> <p>Reason for Rejection: There are no directions provided for an RO to take regarding Control Room Abandonment due to Control Room HVAC. Additionally, there are no directions provided for an RO to take with regards to MCR HVAC during Control Room Abandonment.</p> <p>Randomly reselected another item within 295016 AK2 item: AK2.01 Remote shutdown panel: Plant-Specific</p>
RO 2/1	262001 AC Electrical Distribution	<p>A2.08 - Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Opening a disconnect under load</p> <p>Reason for Rejection: All disconnects at Limerick require operator action to operate, therefore there are no situations in which a disconnect would be opened under load that would not involve operator error. Furthermore, there are no procedural actions for an RO to take to correct, control, or mitigate the consequences of a disconnect intentionally opened under load.</p> <p>Randomly reselected another item within 262001 A2 Item: A2.03 Loss of off-site power</p>

RO 1/2	295022 Loss of CRD Pumps	<p>AK3. Knowledge of the reasons for the following responses as they apply to LOSS OF CRD PUMPS: AK3.02 CRDM high temperature</p> <p>Reason for Rejection: There are no Emergency or Abnormal procedures that are exercised as a result of CRDM high temperature.</p> <p>Randomly reselected another Tier 1/Group 2 system, AK3 item: 295009 Low Reactor Water Level / 2, AK3.01. Knowledge of the reasons for the following responses as they apply to Recirculation pump run back: Plant-Specific</p>
RO 1/1	295023 Refueling Accident	<p>AA1.01 - Ability to operate and/or monitor the following as they apply to REFUELING ACCIDENTS : Secondary containment ventilation</p> <p>Reason for Rejection: Review of Sample plan determined there was an oversampling of K/As related to Secondary Containment ventilation and response to system isolations.</p> <p>Randomly reselected another 295023 item: AA2.02, Fuel Pool Level</p>
RO 2/1	223002 Primary Containment Isolation System/Nuclear Steam Supply Shut- Off	<p>K1.12 - Knowledge of the physical connections and/or cause effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the following: Standby gas treatment system</p> <p>Reason for Rejection: Review of Sample plan determined there was an oversampling of K/As related to Secondary Containment ventilation and response to system isolations. Additionally Tier 2 Group 1 sample already includes two system 261000 (SGTS) Items</p> <p>Randomly reselected another 223002 K1 item: K1.01, Main steam System</p>
RO 2/1	215005 APRM / LPRM	<p>K3.08 - Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on following: core thermal calculations</p> <p>Reason for Rejection: APRM / LPRMS are not utilized to determine Core Thermal Power Calculations. Core Thermal Power is independently determined by a thermodynamic heat balance and is infected by LPRM failures</p> <p>Randomly reselected another 215005 K3 Item: K3.01, RPS</p>
SRO 1/1	295023 Refueling Acc Cooling Mode / 8	<p>2.4.34 - Emergency Procedures / Plan: Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another 295023 generic item: 2.4.11, Knowledge of abnormal condition procedures</p>

SRO 1/2	295013 High Suppression Pool Temperature / 5	<p>2.4.46 - Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another 295013 generic item: 2.1.25, Ability to interpret reference materials, such as graphs, curves, tables, etc.</p>
SRO 2/1	217000 RCIC	<p>2.4.49 - Emergency Procedures / Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another 217000 generic item: 2.4.16, Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.</p>
SRO 2/1	218000 ADS	<p>2.2.39 - Equipment Control: Knowledge of less than one hour technical specification action statements for systems.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another 218000 generic item: 2.2.40, Ability to apply Technical Specifications for a system.</p>
SRO 2/2	204000 RWCU	<p>2.4.2 - Emergency Procedures / Plan: Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another 204000 generic item: 2.1.41, Ability to obtain and interpret station electrical and mechanical drawings.</p>
SRO Tier 3		<p>2.1.13, Knowledge of facility requirements for controlling vital / controlled access.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another generic item: 2.1.9, Ability to direct personnel activities inside the control room.</p>
SRO Tier 3		<p>2.2.7, Knowledge of the process for conducting special or infrequent tests.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another generic item: 2.2.6, Knowledge of the process for making changes to procedures.</p>

SRO Tier 3		<p>2.3.15, Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.</p> <p>7/27/10 review of sample plan by chief examiner identified this K/A as not appropriate for development of an SRO level question</p> <p>Randomly reselected another generic item: 2.3.14, Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.</p>
RO	233000 Fuel Pool Cooling/Cleanup	<p>2.2.37 - Equipment Control: Ability to determine operability and / or availability of safety related equipment.</p> <p>Reason for Rejection: Fuel Pool Cleanup has a limited interface with safety related equipment. A discriminating question for the system could not be written</p> <p>Randomly reselected another 233000 Generic Item: 2.4.4, Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.</p>
RO	241000 Reactor/Turbine Pressure Regulator	<p>K5.05 - Knowledge of the operational Implications of the following concepts as they apply to REACTOR/TURBINE PRESSURE REGULATING SYSTEM : Turbine inlet pressure vs. turbine load</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, a discriminating question for the system could not be written for this specific knowledge</p> <p>Replaced with another 241000 Item: A1.07, Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls including: Bypass valve position</p>
RO	201003 Control Rod and Drive Mechanism	<p>A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: Reactor power</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, a discriminating question for the system could not be written for this specific knowledge</p> <p>Replaced with another 201003 item: K5.01, Knowledge of the operational implications of the following concepts as they apply to CONTROL ROD AND DRIVE MECHANISM: Hydraulics</p>
RO		<p>2.1.15, Knowledge of administrative requirements for temporary management directives, such as standing orders, night orders, Operations memos, etc.</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, This was determined to be more applicable to an SRO, a discriminating RO question for this KA could not be written</p> <p>Randomly reselected another Conduct of Operations Item: 2.1.2, Knowledge of operator responsibilities during all modes of plant operation.</p>

SRO	295004 Partial or Total Loss of DC Pwr	<p>AA2.01 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : Cause of partial or complete loss of D.C. power</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, This was determined to be more applicable to an RO, a discriminating SRO question for this KA could not be written</p> <p>Randomly reselected another Tier 1 Group 1 Item: 295031 Reactor Low Water Level, EA.04, Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling</p>
SRO	295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown	<p>EA2.06 - Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Reactor pressure</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, This was determined to be more applicable to EA2.02</p> <p>Replaced with 295037, EA2.02, Reactor Water Level</p>
SRO	295038 High Off-site Release Rate	<p>EA2.02 - Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : Total number of curies released</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, This was determined that a discriminating question related to Operations responsibilities could not be developed.</p> <p>Randomly reselected another 295038, EA2 item, EA2.04, Source of off-site release</p>
SRO	204000 RWCU	<p>2.2.41, Ability to obtain and interpret station electrical and mechanical drawings.</p> <p>Reason for Rejection: Based on Review during NRC Prep Week, This was determined to be more applicable to an RO, a discriminating SRO question for this KA could not be written</p> <p>Randomly reselected another Conduct of Operations item: 2.1.20, Ability to interpret and execute procedure steps.</p>

Facility: <u>LGS</u>		Date of Examination: <u>10/04/10</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>ILT09-1</u>

  

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
L. Conduct of Operations	N, R	G.2.1.3 Shift Turnover Checklist
M. Conduct of Operations	N, R	G.2.2.12 Evaluate Valve Stroke Data ST-6-107-200-0
N. Equipment Control	N, R	G.2.2.12 Review ST-6-047-370-1, Pre Control Rod Withdrawal Check
O. Radiation Control	D,R,P	G.2.3.11 Gaseous Effluent Release Rate Determination (2008 RO A3)
Emergency Procedures/Plan		

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, (S)imulator, or Class(R)oom

(D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)

(N)ew or (M)odified from bank ( $\geq 1$ )

(P)revious 2 exams ( $\leq 1$ ; randomly selected)

ONE  
ON  
ONE

MUST  
be  
done w/it.  
SRO

Facility: <u>LGS</u>		Date of Examination: <u>10/04/10</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>ILT09-1</u>

  

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
P. Conduct of Operations	N, R	G.2.1.3 Shift Turnover Checklist
Q. Conduct of Operations	N, R	G.2.1.5 Maintain Minimum Shift Staffing and Control Overtime <i>ONE ON ONE</i>
R. Equipment Control	N, R	G.2.2.12 Review ST-6-047-370-1, Pre Control Rod Withdrawal Check <i>MUST Be Done with RO</i>
S. Radiation Control	D,R,P	G.2.3.6 Review and Approve a Liquid Rad Waste Discharge Permit, (2008 SRO A3)
T. Emergency Procedures/Plan	D, R	G.2.4.21 Make an E-plan Classification, <i>ONE ON ONE</i> (0131)

**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, (S)imulator, or Class(R)oom  
 (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)  
 (N)ew or (M)odified from bank ( $\geq 1$ )  
 (P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: LGS	Date of Examination: 10/04/10	
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	Operating Test No.: <u>ILT09-1</u>	
Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. CRD Hydraulic System / Perform Reactor , Startup, Alternate Path (2008 JPM A)	A, D, L, S, P	1
b. Manually place a RFP in Service, Alternate Path	N, A, S	2
c. Transfer HPCI From Pressure Control Mode to Level Control Mode, Alternate Path	A, N, S	4
d. T-228, Inerting/Purging Primary Containment	N, S	5
e. Transfer D13 from 101 to 201 (0519)	A, D, S	6
f. Control Rod Exercise Test	N, S	7
g. Comp Cooling Water / Align RECW for DW Cooling (2008 JPM G)	A, D, EN, S, P	8
h. Manually Isolate the RE Enclosure (0022)	D, S	9
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Bypassing and Removing the *A RPS and UPS Static Inverter from Service (0203)	D, R	6
j. Alignment of Equipment or Operation for Shutdown Cooling (Fire Safe Shutdown)	E, N, L, R,	4
k. RO, SRO-I, SRO-U, Scram and MSIV closure from the AER (0261)	A, D, E, L, R	7
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must 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		
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)	
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		



Facility: LGS		Date of Examination: 10/04/10
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: ILT09-1

  

Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. CRD Hydraulic System / Perform Reactor , Startup, Alternate Path (2008 JPM A)	A, D, L, S, P	1
b. Manually place a RFP in Service, Alternate Path	N, A, S	2
c. Transfer HPCI From Pressure Control Mode to Level Control Mode, Alternate Path	A, N, S	4
d. T-228, Inerting/Purging Primary Containment	N, S	5
e. Transfer D13 from 101 to 201 (0519)	A, D, S	6
f.		
g. Comp Cooling Water / Align RECW for DW Cooling (2008 JPM G)	A, D , EN, S, P	8
h. Manually Isolate the RE Enclosure (0022)	D, S	9

  

In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Bypassing and Removing the *A RPS and UPS Static Inverter from Service (0203)	D, R	6
j. Alignment of Equipment or Operation for Shutdown Cooling (Fire Safe Shutdown)	E, N, L, R,	4
k. RO, SRO-I , SRO-U, Scram and MSIV closure from the AER (0261)	A, D, E, L, R	7

  

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
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* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: LGS	Date of Examination: 10/04/10	
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>	Operating Test No.: ILT09-1	
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. CRD Hydraulic System / Perform Reactor , Startup, Alternate Path (2008 JPM A)	A, D, L, S, P	1
b. Manually place a RFP in Service, Alternate Path	N, A, S	2
c.		
d.		
e.		
f.		
g. Comp Cooling Water / Align RECW for DW Cooling (2008 JPM G)	A, D , EN, S, P	8
h.		
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Bypassing and Removing the *A RPS and UPS Static Inverter from Service (0203)	D, R	6
j. Alignment of Equipment or Operation for Shutdown Cooling (Fire Safe Shutdown)	E, N, L, R,	4
k.		
<p><sup>@</sup> All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)	
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		

Facility: Limerick 1 &amp; 2

Scenario No.: 2

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:

Reactor Power is 19%, Unit 2 100% power

Turnover:

- Unit 1 is in OPCON 1, Reactor Power is approximately 19%
- GP-2, Normal Plant Startup is in progress and complete through step 3.4.25.
- Rod Move Sheet sequence step #22, Group 5 is complete, Step #23 is in progress, with rod 10-11 at 00 and going to position 12
- GP-2, App. 3, Startup of the Main Turbine is in progress and complete through step 3.3.7
- All MCR annunciators in alarm are understood and expected due to present plant condition.
- "1B" RFP is in AUTO through the 108B
- Both recirc pumps are operating at 28% speed
- "1A" and "1B" Condensate pumps are in service
- "1B" and "1C" Circ water pumps are in service
- RWCU is in service with "1A" pump and both F/Ds
- "1B" DW Chiller in service
- All ECCS are operable
- All available Deep Bed Demins are in service
- 4 Condensate Filter Demins are in service

Inoperable/Out of Service Equipment and ETR

- 1A EHC pump needs to be removed from service before Startup continues

Planned Evolutions:

- Prior to continuing Control Rod Withdrawal, swap EHC pumps from 1A to 1B per S31.6.C, Swapping operating EHC Pumps prior to continuing control rod withdrawal.
- Continue with GP-2, and GP-2, App. 3 activities in support of plant startup.
- Regulatory Action Log has been reviewed and no equipment is known to be INOP which would affect continuing the startup.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	Swap EHC pumps

2	N/A	N-SRO R-RO	Pull control rods per GP-2 in support of plant startup.
3	MPR004B	TS, I-SRO I-RO	APRM Fails Inoperable
4	MED282C	C-BOP TS,C- SRO	Loss of Div III DC
5	MRR442B	C-SRO C-RO C-BOP	Recirc Pump 1B RPT Breaker Trip
6	MRP029D MRP407C MSL197	M	ATWS
7	MRD024	C- RO	Rod Drive Control System Failure
8	MEH108	C-BOP C-SRO C-RO	Turbine Bypass valves fail
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Limerick 1 &amp; 2

Scenario No.: 4

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Initial Conditions:

Unit 1 at 75% power. Unit 2 is at 100% power.

## Turnover:

OPRM Pre-Trip Alarms have been occurring sporadically and have been evaluated by Operations and Reactor Engineering. The alarms are expected for current plant conditions and planned power ascension may proceed.

## Inoperable/Out of Service Equipment and ETR

- Inboard MSIV HV-41-1F022A inadvertently closed due to an Electrical Fault
  - Repairs complete on HV-41-1F022A
- RCIC is Out of Service for repairs to the RCIC Trip Throttle Valve, HV-50-112
  - Repairs are expected to take 24 hours

## Planned Evolutions:

- Open the MSIV HV-41-1F022A per S41.3.B, Reopening a Single Isolated MSIV.
- Raise Reactor Power to 100% power per GP-5 Appendix 2, Planned Rx Maneuvering Without Shutdown, Section 3.2, Rx Power Restoration.
- The RE is in the control room.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-SRO N-BOP	Open Inboard MSIV HV-41-1F022A
2	N/A	R-RO N-SRO	Raise Power to 100%
3	MRR504B	C-RO C-BOP TS,C-SRO	Reactor Recirc Pump 1B Shaft Shear
4	MCW484A MCW486B	C-BOP C-SRO	TECW pump A Trip, B TECW fails to auto start
5	VIM123A01	C-BOP TS,C-SRO	RWCU A pump vibration, and Low Flow
6	MRP445 MHP446A MHP446B	M	HPCI Steam leak

7	MRP029C	I-RO	RPS Failure
8	MFW244B	C-RO	"A" RFP Steam Supply Valve Fails
9	MAD141D	C-BOP C-SRO	E SRV fails to open
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Limerick 1 &amp; 2

Scenario No.: 5

Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Initial Conditions:

Unit 1 Reactor Power is 100%, Unit 2 Reactor Power is 100%.

## Turnover:

## Inoperable/Out of Service Equipment and ETR:

None

## Planned Evolutions:

- Maintain 100% power
- Place HPCI in Full Flow Test, using the Manual Quick Start Method per S55.1.D for oil sampling.
  - Completion of oil sampling is expected to take 15 minutes.
  - HPCI will be shutdown when sampling is complete
  - 1A RHR is in Suppression Pool cooling to support HPCI operation

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP N-SRO	Start HPCI using Manual Quick Start Method
2	MHP448B	C-BOP TS, C-SRO	HPCI Flow controller failure
3	MFH564A	C-SRO R-RO	2A Feedwater Heater Isolation
4	MRP029A MVI234G	I – SRO TS - SRO	Pressure Instrument Fails High & RPS Failure
5	MVI231A MDG420A	C-BOP TS, C-SRO C-RO	Div 1 LOCA Signal. D11 fails to start
6	MCU575 MCU195A MCU195B MCU195C	M	Unisolable Steam leak will occur in RWCU Regen Heat Exchanger Room.
7	MRR440A MMS067	M	LOCA via "1A" Recirc
8	MRH172C MCS183B	C-BOP	"C" RHR pump and "B" Core Spray pump fail to auto start.
9	MRH171B MRH528C	C-BOP C-SRO C-RO	Failure of B RHR pump and "A" RHR drywell Spray valves

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