

Facility: Limerick Generating Station		Date of Exam: 05/04/2001		Exam Level: SRO									
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	
1. Emergency & Abnormal Plant Evolutions	1	4	5	5				4	5			3	26
	2	4	3	2				1	7			0	17
	Tier Totals	8	8	7				5	12			3	43
2. Plant Systems	1	2	0	3	1	3	2	4	2	1	2	3	23
	2	2	2	2	2	1	1	1	0	1	0	1	13
	3	0	0	0	0	0	1	1	1	1	0	0	4
	Tier Totals	4	2	5	3	4	4	6	3	3	2	4	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					3		7		3		4		17
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. Actual point totals must match those specified in the table.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

BWR SRO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
295003 Partial or Complete Loss of AC Pwr / VI			X				AK3.02 - Selective tripping (21)	3.1	1
295006 SCRAM / I		X			X		AK2.02 - Reactor water level control system (23) AA2.05 - Whether a reactor SCRAM has occurred (51S)	3.8 4.6	1 1
295007 High Reactor Pressure / III		X					AK2.03 - RHR/LPCI: Plant-Specific (24)	3.2	1
295009 Low Reactor Water Level / II				X			AA1.02 - Reactor water level control (8)	4.0	1
295010 High Drywell Pressure / V	X				X		AK1.01 - Downcomer submergence: Mark-I&II (25) AA2.02 - Drywell pressure (52S)	3.4 3.9	1 1
295013 High Suppression Pool Temp. / V	X						AK1.03 - Localized heating (27)	3.3	1
295014 Inadvertent Reactivity Addition / I	X						AK1.06 - Abnormal reactivity additions (9)	3.9	1
295015 Incomplete SCRAM / I				X		X	AA1.01 - CRD hydraulics (28) 2.1.2 - Knowledge of operator responsibilities during all modes of plant operation. (29)	3.9 4.0	1 1
295016 Control Room Abandonment / VII				X		X	AA1.07 - Control room/local control transfer mechanisms (30) 2.2.3 - (multi-unit) Knowledge of the design, procedural, and operational differences between units. (53S)	4.3* 3.3	1 1
295017 High Off-site Release Rate / IX		X					AK2.10 - Process radiation monitoring system (31)	3.6	1
295023 Refueling Accidents Cooling Mode / VIII			X				AK3.02 - Interlocks associated with fuel handling equipment (33)	3.8*	1
295024 High Drywell Pressure / V			X				EK3.01 - Drywell spray operation Mark-I&II (34)	4.0	1
295025 High Reactor Pressure / III		X					EK2.01 - RPS (92)	4.1	1
295026 Suppression Pool High Water Temp. / V				X	X		EA1.01 - Suppression pool cooling (35) EA2.02 - Suppression pool level (54S)	4.1 3.9	1 1
295030 Low Suppression Pool Water Level / V					X		EA2.01 - Suppression pool Level (55S)	4.2*	1
295031 Reactor Low Water Level / II			X				EK3.02 - Core coverage (37)	4.7*	1
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / I			X				EK3.02 - SBLC injection (40)	4.5*	1
295038 High Off-site Release Rate / IX		X				X	EK2.03 - Plant ventilation systems (41) 2.1.7 - Ability to evaluate plant performance and make operation judgments based on operating characteristics, reactor behavior, and instrument interpretation. (56S)	3.8 4.4	1 1
500000 High Containment Hydrogen Conc. / V	X				X		EK1.01 - Containment integrity (44) EA2.01 - Hydrogen monitoring system availability (57S)	3.9 3.5	1 1
K/A Category Totals:	4	5	5	4	5	3	Group Point Total:		26

<div>ES-401</div> <div>BWR SRO Examination Outline</div> <div>Emergency and Abnormal Plant Evolutions - Tier 1/Group 2</div> <div>Form ES-401-1</div>									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
295001 Partial or Complete Loss of Forced Core Flow Circulation / I & IV	X						AK1.02 - Power/flow distribution (20)	3.5	1
295002 Loss of Main Condenser Vacuum / III					X		AA2.02 - Reactor Power: Plant-Specific (63S)	3.3	1
295004 Partial or Total Loss of DC Pwr / VI				X			AA1.02 - Systems necessary to assure safe plant shutdown (22)	4.1	1
295005 Main Turbine Generator Trip / III	X						AK1.03 - Pressure effects on reactor level (6)	3.7	1
295008 High Reactor Water Level / II	X						AK1.03 - Feed flow/steam flow mismatch (7)	3.2	1
295012 High Drywell Temperature / V			X				AK3.01 - Increased drywell cooling (26)	3.6	1
295018 Partial or Total Loss of CCW / VIII					X		AA2.05 - System pressure (58S)	2.9	1
295019 Partial or Total Loss of Inst. Air / VIII			X				AK3.03 - Service air isolation: Plant-Specific (10)	3.2	1
295020 Inadvertent Cont. Isolation / V & VII					X		AA2.06 - Cause of isolation (59S)	3.8	1
295021 Loss of Shutdown Cooling / IV	X						AK1.01 - Decay heat (32)	3.8	1
295022 Loss of CRD Pumps / I					X		AA2.02 - CRD system status (91)	3.4	1
295028 High Drywell Temperature / V		X					EK2.04 - Drywell ventilation (36)	3.6	1
295029 High Suppression Pool Water Level / V					X		EA2.01 - Suppression pool water level (60S)	3.9*	1
295032 High Secondary Containment Area Temperature / V					X		EA2.01 - Area temperature (61S)	3.8	1
295033 High Secondary Containment Area Radiation Levels / IX		X					EK2.03 - Secondary containment ventilation: Plant-Specific (38)	3.9	1
295034 Secondary Containment Ventilation High Radiation / IX					X		EA2.01 - Ventilation radiation levels (62S)	4.2	1
295035 Secondary Containment High Differential Pressure / V									
295036 Secondary Containment High Sump/Area Water Level / V		X					EK2.01 - Secondary containment equipment and floor drain system (39)	3.2	1
600000 Plant Fire On Site / VIII									
K/A Category Point Totals:	4	3	2	1	7	0	Group Point Total:		17

ES-401		BWR SRO Examination Outline Plant Systems - Tier 2/Group 1										Form ES-401-1		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
202002 Recirculation Flow Control	X											K1.06 - A.C. electrical (78)	3.0	1
203000 RHR/LPCI: Injection Mode								X				A2.16 - Loss of coolant accident (96)	4.5*	1
206000 HPCI											X	2.4.10 - Knowledge of annunciator response procedures (80)	3.1	1
209001 LPCS											X	2.4.45 - Ability to prioritize and interpret the significance of each annunciators or alarm. (64S)	3.5	1
211000 SLC			X									K3.01 - Ability to shutdown the reactor in certain conditions (98)	4.4*	1
212000 RPS							X					A1.04 - RPS - bus voltage: Plant-Specific (81)	3.0	1
215004 Source Range Monitor					X							K5.01 - Detector operation (84)	2.6	1
215005 APRM / LPRM				X								K4.06 - Effects of detector aging on LPRM/APRM readings (85)	2.8	1
216000 Nuclear Boiler Instrumentation					X							K5.02 - Vessel pressure measurement (86)	3.2	1
217000 RCIC			X									K3.02 - Reactor vessel pressure (100)	3.6	1
218000 ADS					X							K5.01 - ADS Logic (87)	3.8	1
223001 Primary CTMT and Auxiliaries							X					A1.05 - Hydrogen concentration (89)	3.3	1
223002 PCIS/Nuclear Steam Supply Shutoff							X					A1.01 - System indicating lights and alarms (90)	3.5	1
226001 RHR/LPCI: CTMT Spray Mode							X					A1.03 - Suppression chamber pressure: Mark I-II (11)	3.8	1
239002 SRV's						X					X	K6.04 - D.C. power: Plant-Specific(1) 2.4.46 - Ability to verify that the alarms are consistent with the plant conditions. (65S)	3.2 3.6	1 1
241000 Reactor/Turbine Pressure Regulator						X		X				K6.01 - A.C. electrical power (14) A2.04 - Failed open/closed control/governor valve (15)	2.9 3.6	1 1
259002 Reactor Water Level Control										X		A4.06 - DP/Single/three element control selector switch: Plant-Specific (3)	3.2	1
261000 SGTS	X											K1.07 - Elevated release stack (16)	3.2	1
262001 AC Electrical Distribution			X									K3.04 - Uninterruptible power supply (17)	3.3	1
264000 EDG's										X		A4.01 - Adjustment of exciter voltage (4)	3.4	1
290001 Secondary CTMT									X			A3.01 - Secondary containment isolation (5)	4.0	1
K/A Category Point Totals:	2	0	3	1	3	2	4	2	1	2	3	Group Point Total:	23	

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BWR SRO Examination Outline
Plant Systems - Tier 2/Group 2

Form ES-401-1

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
201001 CRD Hydraulic		X										K2.03 - Backup SCRAM valve solenoids (93)	3.6*	1
201002 RMCS									X			A3.01 - Control rod block actuation (77)	3.1	1
201003 ISCS														
201006 RWM														
202001 Recirculation			X									K3.05 - Recirculation system MG sets: Plant-Specific (95)	3.3	1
204000 RWCU				X								K4.07 - Draining of reactor water to various locations (79)	2.9	1
205000 Shutdown Cooling	X											K1.01 - Reactor pressure (97)	3.6	1
214000 RPIS														
215002 RBM		X										K2.03 - APRM channels: BWR-3,4,5 (82)	2.9	1
215003 IRM											X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (83)	3.7	1
219000 RHR/LPCI: Torus/Pool Cooling Mode					X							K5.04 - Heat exchanger operation (88)	2.9	1
230000 RHR/LPCI: Torus/Pool Spray Mode														
234000 Fuel Handling Equipment			X									K3.04 - fcore modifications/alterations (13)	3.8	1
245000 Main Turbine Gen. And Auxiliaries														
259001 Reactor Feedwater				X								K4.11 - Recirculation runbacks: Plant-Specific (2)	3.5	1
262002 UPS (AC/DC)														
263000 DC Electrical Distribution														
271000 Offgas							X					A1.01 - Condenser Vacuum (18)	3.0	1
272000 Radiation Monitoring														
286000 Fire Protection														
290003 Control Room HVAC														
300000 Instrument Air	X											K1.04 - Cooling water to compressor (42)	2.9	1
400000 Component Cooling Water						X						K6.05 - Motors (43)	2.5	1
K/A Category Point Totals:	2	2	2	2	1	1	1	0	1	0	1	Group Point Total:		13

ES-401		BWR SRO Examination Outline Plant Systems - Tier 2/Group 3										Form ES-401-1		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
201003 Control Rod and Drive Mechanism								X				A2.04 - Single control rod SCRAM (94)	3.6	1
215001 Traversing In-core Probe							X					A1.03 - Valve status: Mark-I & II (Not-BWR 1) (99)	2.8	1
233000 Fuel Pool Cooling and Cleanup									X			A3.02 - Pump trip(s) (12)	2.6	1
239001 Main and Reheat Steam														
256000 Reactor Condensate														
268000 Radwaste														
288000 Plant Ventilation						X						K6.01 - A.C. electrical (19)	2.7	1
290002 Reactor Vessel Internals														
K/A Category Point Totals:	0	0	0	0	0	1	1	1	1	0	0	Group Point Total:	4	

Facility: Limerick Generating Station		Date of Exam: 05/04/2000		Exam Level: SRO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.1	Knowledge of conduct of operations. (45)	3.8	1	
	2.1.12	Ability to apply technical specifications for a system. (66S)	4.0	1	
	2.1.34	Ability to maintain primary and secondary plant chemistry within allowable limits. (67S)	2.9	1	
	Total			3	
Equipment Control	2.2.27	Knowledge of the refueling process. (46)	3.5	1	
	2.2.22	Knowledge of limiting conditions form operations and safety limits. (47)	4.1	1	
	2.2.23	Ability to track limiting conditions for operations. (68S)	3.8	1	
	2.2.14	Knowledge of the process for making configurations changes. (69S)	3.0	1	
	2.2.8	Knowledge of the process for determining if the proposed change, test, or experiment involves an unreviewed safety question.(70S)	3.3	1	
	2.2.20	Knowledge of the process for managing troubleshooting activities. (71S)	3.3	1	
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (72S)	3.7	1	
Total			7		
Radiation Control	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements. (48)	3.0	1	
	2.3.9	Knowledge of the process for performing a containment purge. (73S)	3.2	1	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. (74S)	3.3	1	
Total			3		
Emergency Procedures and Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (49)	4.3	1	
	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions. (50)	3.8	1	
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures. (76)	4.0	1	
	2.4.9	Knowledge of lower power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies. (75S)	3.9	1	
	Total			4	
Tier 3 Point Total (SRO)				17	

Facility: Limerick Generating Station				Date of Exam: 05/04/2001				Exam Level: RO					
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	
1. Emergency & Abnormal Plant Evolutions	1	4	3	3				2	0			1	13
	2	4	6	3				3	2			1	19
	3	1	1	2				0	0			0	4
	Tier Totals	9	10	8				5	2			2	36
2. Plant Systems	1	3	2	3	3	3	2	3	3	2	2	2	28
	2	2	2	3	2	2	1	2	2	1	2	0	19
	3	0	0	1	0	0	1	1	0	1	0	0	4
	Tier Totals	5	4	7	5	5	4	6	5	4	4	2	51
3. Generic Knowledge and Abilities				Cat 1		Cat 2		Cat 3		Cat 4		13	
				3		4		3		3			
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. Actual point totals must match those specified in the table.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

ES-401		BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1						Form ES-401-2	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
295005 Main Turbine Generator Trip / III	X						AK1.03 - Pressure effects on reactor level (6)	3.5	1
295006 SCRAM / I		X					AK2.02 - Reactor water level control system (23)	3.8	1
295007 High Reactor Pressure / III		X					AK2.03 - RHR/LPCI: Plant-Specific (24)	3.1	1
295009 Low Reactor Water Level / II				X			AA1.02 - Reactor water level control (8)	4.0	1
295010 High Drywell Pressure / V	X						AK1.01 - Downcomer submergence: Mark-I&II (25)	3.0	1
295014 Inadvertent Reactivity Addition / I	X						AK1.06 - Abnormal reactivity additions. (9)	3.8	1
295015 Incomplete SCRAM / I				X		X	AA1.01 - CRD hydraulics (28)	3.8	1
							2.1.2 - Knowledge of operator responsibilities during all modes of plant operation (29)	3.0	1
295024 High Drywell Pressure / V			X				EK3.01 - Drywell spray operation: MarkI&II (34)	3.6	1
295025 High Reactor Pressure / III		X					EK2.01 - RPS (92)	4.1*	1
295031 Reactor Low Water Level / II			X				EK3.02 - Core Coverage (37)	4.4*	1
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / I			X				EK3.02 - SBLC injection (40)	4.3*	1
500000 High Containment Hydrogen Conc. / V	X						EK1.01 - Containment integrity (44)	3.3	1
K/A Category Totals:	4	3	3	2	0	1	Group Point Total:		13

<div>ES-401</div> <div>BWR RO Examination Outline</div> <div>Emergency and Abnormal Plant Evolutions - Tier 1/Group 2</div> <div>Form ES-401-2</div>									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
295001 Partial or Complete Loss of Forced Core Flow Circulation / I & IV	X						AK1.02 - Power/Flow distribution (20)	3.3	1
295002 Loss of Main Condenser Vacuum / III		X					AK2.05 - Feedwater system (51R)	2.7	1
295003 Partial or Complete Loss of AC Pwr / VI			X				AK3.02 - Selective tripping (21)	2.9	1
295004 Partial or Complete Loss of DC Pwr / VI				X			AA1.02 - Systems necessary to assure safe plant shutdown (22)	3.8	1
295008 High Reactor Water Level / II	X						AK1.03 - Feed flow/steam flow mismatch (7)	3.2	1
295011 High Off-site Release Rate / IX									
295012 High Drywell Temperature / V			X				AK3.01 - Increased drywell cooling (26)	3.5	1
295013 High Suppression Pool Temp. / V	X						AK1.03 - Localized heating (27)	3.0	1
295016 Control Room Abandonment / VII				X			AA1.07 - Control room/local control transfer mechanisms (30)	4.2*	1
295017 High Off-site Release Rate / IX		X					AK2.10 - Process radiation monitoring system (31)	3.3	1
295018 Partial or Complete Loss of CCW / VIII		X					AK2.02 - Plant Operations (52R)	3.4	1
295019 Partial or Complete Loss of Inst. Air / VIII			X				AK3.03 - Service air isolations: Plant-Specific (10)	3.2	1
295020 Inadvertent Cont. Isolation / V & VII	X						AK1.05 - Loss of Drywell/Containment cooling (53R)	3.3	1
295022 Loss of CRD Pumps / I					X		AA2.02 - CRD system status (91)	3.3	1
295026 High Suppression Pool Water Temp. / V				X			EA1.01 - Suppression pool cooling (35)	4.1	1
295027 High Off-site Release Rate / IX									
295028 High Drywell Temperature / V		X					EK2.04 - Drywell Ventilation (36)	3.6	1
295029 High Suppression Pool Water Level / V					X		EA2.03 - Drywell/containment water level (54R)	3.4	1
295030 Low Suppression Pool Water Level / V									
295033 High Secondary Containment Area Radiation Levels / IX		X					EK2.03 - Secondary containment ventilation: Plant-Specific (38)	3.7	1
295034 Secondary Containment Ventilation High Radiation / IX						X	2.1.14 - Knowledge of systm status criteria which required the notification of plant personnel (55R)	2.5	1
295038 High Off-site Release Rate / IX					X		EA2.03 - Plant ventilation system (41)	3.6	1
600000 Plant Fire On Site / VIII									
K/A Category Point Totals:	4	6	3	3	2	1	Group Point Total:		19

ES-401		BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3						Form ES-401-2	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
295021 Loss of Shutdown Cooling / IV	X						AK1.01 - Decay heat (32)	3.6	1
295023 Refueling Accidents / VIII			X				AK3.02 - Interlocks associated with fuel handling equipment (33)	3.4	1
295032 High Secondary Containment Area Temperature / V									
295035 Secondary Containment High Differential Pressure / V			X				EK3.02 - Secondary containment ventilation response (56R)	3.3	1
295036 Secondary Containment High Sump/Area Water Level / V		X					EK2.01 - Secondary containment equipment and floor drain system (39)	3.1	1
K/A Category Point Totals:	1	1	2	0	0	0	Group Point Total:		4

ES-401		BWR RO Examination Outline Plant Systems - Tier 2/Group 1										Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
201001 CRD Hydraulic		X		X								K2.03 - Backup SCRAM valve solenoids (93) K4.04 - Scramming control rods with inoperative SCRAM solenoid valves (back-up SCRAM valves (57R))	3.5* 3.6	1 1
201002 RMCS									X			A3.01 - Control rod block actuation (77)	3.2	1
202002 Recirculation Flow Control	X											K1.06 - A.C. electrical (78)	2.9	1
203000 RHR/LPCI: Injection Mode	X							X				A2.16 - Loss of coolant accident (96) K1.04 - Keep fill system (58R)	4.4* 3.3	1 1
206000 HPCI											X	2.4.10 - Knowledge of annunciator response procedures. (80)	3.0	1
209001 LPCS		X							X			K2.03 - Initiation logic (59R) A3.03 - System pressure (60R)	2.9* 3.5	1 1
211000 SLC			X									K3.01 - Ability to shutdown the reactor in certain conditions (98)	4.3*	1
212000 RPS							X					A1.04 - RPS bus voltage: Plant-Specific (81)	2.8*	1
215003 IRM											X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (83)	3.4	1
215004 SRM					X							K5.01 - Detector operation (84)	2.6	1
215005 APRM / LPRM				X								K4.06 - Effects of detector aging on LPRM/APRM readings (85)	2.6	1
216000 Nuclear Boiler Instrumentation					X							K5.02 - Vessel pressure measurement (86) A2.06 - Loss of power supply (61R)	3.1 2.9	1 1
217000 RCIC			X									K3.02 - Reactor vessel pressure (100)	3.6	1
218000 ADS					X							K5.01 - ADS logic operation (87)	3.8	1
223001 Primary CTMT and Auxiliaries							X					A1.05 - Hydrogen concentration (89)	3.1	1
223002 PCIS/Nuclear Steam Supply Shutoff							X					A1.01 - System indicating lights and alarms (90)	3.5	1
239002 SRV's			X			X						K6.04 - D.C. power: Plant-Specific (1) K3.02 - Reactor over pressurization (62R)	3.0 4.2*	1 1
241000 Reactor/Turbine Pressure Regulator						X		X				K6.01 - A.C. electrical power (14) A2.04 - Failed open/closed control/governor valve(s) (15)	2.8 3.7	1 1
259001 Reactor Feedwater				X								K4.11 - Recirculation runbacks: Plant-Specific (2)	3.5	1
259002 Reactor Water Level Control										X		A4.06 - DP/Single/three element control selector switch: Plant-Specific (3)	3.1	1
261000 SGTS	X											K1.07 - Elevated release stack (16)	3.1	1
264000 EDG's										X		A4.01 - Adjustment of exciter voltage (4)	3.3	1
K/A Category Point Totals:	3	2	3	3	3	2	3	3	2	2	2	Group Point Total:	28	

BWR RO Examination Outline Plant Systems - Tier 2/Group 2															Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts		
201003 Control Rod and Drive Mechanism								X				A2.04 - Single control rod SCRAM (94)	3.5	1		
201006 RWM				X								K4.01 - Insert blocks/errors: P-Spec(Not-BWR6) (63R)	3.4	1		
202001 Recirculation			X									K3.05 - Recirculation system MG sets: Plant-Specific (95)	3.3	1		
204000 RWCU				X								K4.07 - Draining of reactor water to various locations (79)	2.9	1		
205000 Shutdown Cooling	X											K1.01 - Reactor Pressure (97)	3.6	1		
214000 RPIS								X				A2.01 - Failed reed switches (64R)	3.1	1		
215002 RBM		X										K2.03 - APRM channels: BWR-3,4,5 (82)	2.8	1		
219000 RHR/LPCI: Torus/Pool Cooling Mode					X							K5.04 - Heat exchanger operation (88)	2.9	1		
226001 RHR/LPCI: CTMT Spray Mode							X					A1.03 - tSuppression chamber pressure: Mark-I-II (11)	3.5	1		
230000 RHR/LPCI: Torus/Pool Spray Mode																
239001 Main and Reheat Steam										X		A4.03 - System flow (65R)	3.5	1		
245000 Main Turbine Gen. and Auxiliaries																
256000 Reactor Condensate			X									K3.05 - HPCI: Plant-Specific (66R)	3.3	1		
262001 AC Electrical Distribution			X									K3.04 - Uninterruptible power supply (17)	3.3	1		
262002 UPS (AC/DC)																
263000 DC Electrical Distribution					X							K5.01 - Hydrogen generation during battery charging (67R)	2.6	1		
271000 Offgas							X					A1.01 - Condenser vacuum (18)	3.3	1		
272000 Radiation Monitoring		X										K2.02 - Offgas radiation monitoring system (68R)	2.5	1		
286000 Fire Protection																
290001 Secondary CTMT									X			A3.01 - Secondary containment isolation (5)	3.9	1		
290003 Control Room HVAC										X		A4.02 - Fans (69R)	2.8	1		
300000 Instrument Air	X											K1.04 - Cooling water to compressor (42)	2.8	1		
400000 Component Cooling Water						X						K6.05 - Motors (43)	2.8	1		
K/A Category Point Totals:	2	2	3	2	2	1	2	2	1	2	0	Group Point Total:		19		

ES-401		BWR RO Examination Outline Plant Systems - Tier 2/Group 3										Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
215001 Traversing In-core Probe							X					A1.03 - Valve status: Mark-I&II(Not BWR1)(99)	2.6	1
233000 Fuel Pool Cooling and Cleanup									X			A3.02 - Pump trip(s) (12)	2.6	1
234000 Fuel Handling Equipment			X									K3.04 - tCore modifications/alterations (13)	2.9	1
245000 (IS) Fuel Rod Control														
268000 Radwaste														
288000 Plant Ventilation						X						K6.01 - A.C. electrical (19)	2.7	1
290002 Reactor Vessel Internals														
K/A Category Point Totals:	0	0	1	0	0	1	1	0	1	0	0	Group Point Total:		4

Facility: Limerick Generating Station		Date of Exam: 05/04/2001		Exam Level: RO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.1	Knowledge of conduct of operations. (45)	3.7	1	
	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data. (70R)	2.8	1	
	2.1.10	Knowledge of conditions and limitations in the facility license. (71R)	2.7	1	
		Total		3	
Equipment Control	2.2.27	Knowledge of the refueling process. (46)	2.6	1	
	2.2.22	Knowledge of limiting conditions for operations and safety limits. (47)	3.4	1	
	2.2.28	Knowledge of new and spent fuel movement procedures. (72R)	2.6	1	
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (73R)	4.0	1	
		Total		4	
Radiation Control	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements. (48)	2.6	1	
	2.3.9	Knowledge of the process for performing a containment purge. (74R)	2.5	1	
	2.3.2	Knowledge of facility ALARA program. (75R)	2.5	1	
		Total		3	
Emergency Procedures and Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (49)	4.0	1	
	2.4.48	Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions. (50)	3.5	1	
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures. (76)	3.0	1	
		Total		3	
Tier 3 Point Total (RO)				13	

Facility: <u>Limerick Generating Station</u>		Date of Examination: 05/04/2001
Examination Level RO		Operating Test Number: _____
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Shift Turnover	Question: Working Hour Restrictions (A-C-40)
		Question: Shift Turnover Documentation (NOM-C-4.1)
	Fuel Handling	Question: Inadvertent criticality during re-load (ON-120) Question: Continuous communication requirements (FH-105)
A.2	Modifications	Question: Application of temporary alteration (MOD-C-7)
		Question: Independent verification (NOM-C-9.1)
A.3	Exposure Limits and Controls	Question: Locked High Rad area controls (HP-C-202)
		Question: Response to Personnel Contamination (HP-C-818)
A.4	Emergency Response Facilities	Question: Activation of ERP facilities (ERP-140)
		Question: Technical Support Center functions (ERP-700)

Facility: <u>Limerick Generating Station</u>		Date of Examination: 05/04/2001
Examination Level SRO		Operating Test Number: _____
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Shift Staffing	Question: Minimum Staffing (A-C-40)
		Question: Manipulations by Non-Operations Personnel (NOM-C-8.9)
	Fuel Handling	Question: Core Component Transfer Authorization Sheet Revision (RE-C-40)
		Question: Drywell Access during fuel transfer (HP-300)
A.2	Maintenance	Question: Evaluate troubleshooting valve manipulation effect on equipment (AG-CG-41)
		Question: Restoration of T.S. Equipment (NOM-C-8.5)
A.3	Dose Control	Question: Planned Special Exposure (HP-C-108)
		Question: Administrative dose extension (HP-C-106)
A.4	E-Plan P.A.R.	Question: Determine the P.A.R. for given set of conditions (ERP-200)
		Question: Emergency notifications with reduced communications capability (ERP-110)

Facility: Limerick Generating Station		Date of Examination: 05/04/2001	
Exam Level: RO		Operating Test No.: _____	
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a. Transfer D13 from 101 to 201		DAS	6
b. Manually Initiate Standby Liquid Control (SLC)		DAS	1
c. Shutdown Cooling Flow Adjustments - RHRSW Hi Rad		DAS	4
d. Shift HPCI Suction from CST to the Suppression Pool		DS	2
e. Main Turbine Bypass Valve Exercise Test		DS	3
f. Manually Initiate a Control Room Radiation Isolation		DS	9
g. Primary Containment N2 Make-up		NS	5
B.2 Facility Walk-Through			
a. Inadvertent Opening of a Relief Valve		DR	3
b. Remote Alignment of LPCI valves for Fire Safe Shutdown		DR	2
c. Bypass Refuel Floor HVAC isolations and Re-start Refuel Floor HVAC (T-229)		NRA	9
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: Limerick Generating Station		Date of Examination: 05/04/2001	
Exam Level: SRO(I)		Operating Test No.: _____	
B.1 Control Room Systems			
System / JPM Title	Type Code*	Safety Function	
a. Transfer D13 from 101 to 201	DAS	6	
b. Manually Initiate Standby Liquid Control (SLC)	DAS	1	
c. Shutdown Cooling Flow Adjustments - RHRSW Hi Rad	DAS	4	
d. Shift HPCI Suction from CST to the Suppression Pool	DS	2	
e. Main Turbine Bypass Valve Exercise Test	DS	3	
f. Manually Initiate a Control Room Radiation Isolation	DS	9	
g. Primary Containment N2 Make-up	NS	5	
B.2 Facility Walk-Through			
a. Inadvertent Opening of a Relief Valve	DR	3	
b. Remote Alignment of LPCI valves for Fire Safe Shutdown	DR	2	
c. Bypass Refuel Floor HVAC isolations and Re-start Refuel Floor HVAC (T-229)	NAR	9	
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: Limerick Generating Station		Date of Examination: 05/04/2001	
Exam Level: SRO(U)		Operating Test No.: _____	
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a. Primary Containment N2 Make-up		NS	5
b. Main Turbine Bypass Valve Exercise Test		DS	3
c. Shutdown Cooling Flow Adjustments - RHRSW Hi Rad		DAS	4
d.			
e.			
f.			
g.			
B.2 Facility Walk-Through			
a. Bypass Refuel Floor HVAC isolations and Re-start Refuel Floor HVAC (T-229)		NAR	9
b. Remote Alignment of LPCI valves for Fire Safe Shutdown		DR	2
c.			
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: LGS _____ Scenario No.: A1(2,3,4) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 95% Power, OPCON 1, "1A" Chlorine Detector failed downscale.

Turnover: 1A Chlorine Detector failed downscale at the end of last shift. Required regulatory action has not been identified (Tech Spec).

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (ALL)	Maximize Main Generator Reactive Load
2	MED124B	C (PRO/SRO)	Loss of Isophase Bus cooling due to loss of power and failure of the standby fan
3	N/A	R (ALL)	Power drop to <20,000 amps
4	MAD141C MAD141B	I (ALL)	SRV fails open electrically
5	MRP029C MRP407C	M (ALL)	ATWS (electrical)
6	MSL559	C (SRO/RO)	Standby Liquid Control Rupture
7	MCR411B	C (ALL)	CRD Flow Control Valve fails closed

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

Facility: LGS Scenario No.: B1(2,3,4) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 90% Power, OPCON 1, "B" EHC Pump Blocked and out of service for maintenance. _____

Turnover: Place H₂O₂ analyzers in service for monthly reading.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (ALL)	Place H ₂ O ₂ analyzers in service for monthly reading
2	MNS160A	I (PRO/SRO)	Inadvertent isolation of Instrument Gas (Tech Spec)
3	MED263B	C (ALL)	Loss of D12 Safeguard Bus
4	MRR504A	C (ALL)	"1A" Recirc Pump Trip / Shaft Failure
5	N/A	R (ALL)	Reduce power to 33% with control rods
6	MRR440A	M (ALL)	Recirc Loop Rupture
7	MRH171A	I (PRO/SRO)	"1A" RHR pump fails to start

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

Facility: LGS Scenario No.: C1 Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 100% Power

Turnover: Perform ST-6-071-306-1 Channel A1 and A2 RPS Manual SCRAM Channels Functional Test. _____

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (ALL)	RPS Surveillance Test
2	MRDF016F SIMINS MFLCPR 1.12	C (ALL)	Rod Scrams during RPS Test, Thermal Limit MFLCPR >1
3	N/A	R (ALL)	Power Reduced to <80%
4	MPR217A	I (ALL)	RBM Fails (Tech Spec)
5	MRC465	M (ALL)	Steam Line break in RCIC Room
6	MRC464A MRC464B	C (PRO/ SRO)	RCIC isolation valves fail to isolate
7	RRE002	C (ALL)	Steam leak migrates into the HPCI Room through a broken door seal
8	MAD144D	C (SRO/ PRO)	"H" SRV fails to open

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

Facility: LGS Scenario No.: D1 (Spare) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 100% Power, OPCON 1

Turnover: Swap from "1A" to "1B" RECW pump for planned maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (PRO/SRO)	Swap RECW pumps for maintenance
2	MFH564A	I (ALL)	Level Switch fails on 2A Feed Water Heater, causing a string isolation
3	N/A	R (ALL)	Reduce power to <85%
4	MED282A	C (ALL)	Loss of Division 1 DC (Tech Spec)
5	MFW252	M (ALL)	"1A" Loop Feedwater line rupture inside containment
6	MCS184A	I (SRO/PRO)	"1A" Core Spray injection valve fails to open
7	MSC183D	C (SRO/PRO)	"1D" Core Spray Pump fails to auto start

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