Facility: Limerick														Date of Exam: 1/10/05			
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 & Abnormal Plant Evolutions	1	3	4	5	N/A			4	3	N/A		1	20	4	3	7	
	2	0	1	3				2	0			1	7	2	1	3	
	Tier Totals	3	5	8				6	3			2	27	6	4	10	
2. Plant Systems	1	3	2	4	4	1	2	3	1	3	2	1	26	3	2	5	
	2	1	0	1	2	1	2	1	1	1	1	1	12	1	2	3	
	Tier Totals	4	2	5	6	2	4	4	2	4	3	2	38	4	4	8	
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			2			2			3			2	2	1	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 outlines (i.e. except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements..

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

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

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401 BWR Examination Outline Form ES-401-1

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4		03					Reactor water level	3.6	1
295003 Partial or Complete Loss of AC / 6	06						Station blackout: Plant-Specific	3.8	1
295004 Partial or Total Loss of DC Pwr / 6		03					D.C. bus loads	3.3	1
295005 Main Turbine Generator Trip / 3		01					RPS	3.8	1
295006 SCRAM / 1			01				Reactor water level response	3.8	1
295016 Control Room Abandonment / 7					02		Reactor water level	4.2	1
295018 Partial or Total Loss of CCW / 8			07				Cross-connecting with backup systems	3.1	1
295019 Partial or Total Loss of Inst. Air / 8		03					Reactor feedwater	3.2	1
295021 Loss of Shutdown Cooling / 4	01						Decay heat	3.6	1
295023 Refueling Acc / 8				06			Neutron monitoring	3.3	1
295024 High Drywell Pressure / 5	01						Drywell integrity: Plant-Specific	4.1	1
295025 High Reactor Pressure / 3			06			04.49	Alternate rod insertion: Plant-Specific; Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.2; 4	2
295026 Suppression Pool High Water Temp. / 5				03			Temperature monitoring	3.9	1
295027 High Containment Temperature / 5									0
295028 High Drywell Temperature / 5					04		Drywell pressure	4.1	1
295030 Low Suppression Pool Wtr Lvl / 5			02				HPCI operation: Plant-Specific	3.5	1
295031 Reactor Low Water Level / 2			04				Steam cooling	4	1
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1				09			SPDS/ERIS/CRIDS/GDS: Plant-Specific	2.8	1
295038 High Off-site Release Rate / 9				01			Stack-gas monitoring system: Plant-Specific	3.9	1
600000 Plant Fire On Site / 8					17		Systems that may be affected by the fire	3.1	1
K/A Category Totals:	3	4	5	4	3	1	Group Point Total:		20

ES-401	BWR Examination Outline							Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)								
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3									0
295007 High Reactor Pressure / 3									0
295008 High Reactor Water Level / 2									0
295009 Low Reactor Water Level / 2			01				Recirculation pump run back: Plant-Specific	3.2	1
295010 High Drywell Pressure / 5									0
295011 High Containment Temp / 5									0
295012 High Drywell Temperature / 5				02			Drywell cooling system	3.8	1
295013 High Suppression Pool Temp. / 5			02				Limiting heat additions	3.6	1
295014 Inadvertent Reactivity Addition / 1									0
295015 Incomplete SCRAM / 1				02			RPS	4	1
295017 High Off-site Release Rate / 9									0
295020 Inadvertent Cont. Isolation / 5 & 7			03				Drywell/containment temperature response	3.2	1
295022 Loss of CRD Pumps / 1									0
295029 High Suppression Pool Wtr Lvl / 5						01 32	Ability to explain and apply system limits and precautions.	3.4	1
295032 High Secondary Containment Area Temperature / 5									0
295033 High Secondary Containment Area Radiation Levels / 9									0
295034 Secondary Containment Ventilation High Radiation / 9									0
295035 Secondary Containment High Differential Pressure / 5									0
295036 Secondary Containment High Sump/Area Water Level / 5									0
500000 High CTMT Hydrogen Conc. / 5		05					Hydrogen and oxygen recombiners	3.2	1
K/A Category Totals:	0	1	3	2	0	1	Group Point Total:		7

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)											Form ES-401-1		
E/APE # / Name / Safety Function	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection				03								Pump minimum flow protection	3.2	1
205000 Shutdown Cooling Mode						01						A.C. electrical power	3.3	1
206000 HPCI			01									Reactor water level control: BWR-2, 3, 4	4	1
207000 Isolation (Emergency) Condenser														0
209001 LPCS									02			Pump start	3.8	1
209002 HPCS														0
211000 SLC				08								System initiation upon operation of SBLC control switch	4.2	1
212000 RPS									04			System status lights and alarms	3.9	1
215003 IRM										05		Trip bypasses	3.4	1
215004 Source Range Monitor			01				04					RPS; Control rod block status	3.4; 3.5	2
215005 APRM / LPRM							04					SCRAM and rod block trip setpoints	4.1	1
217000 RCIC		02										RCIC initiation signals (logic)	2.8	1
218000 ADS							05					Reactor water level	4.1	1
223002 PCIS/Nuclear Steam Supply Shutoff										03		Reset system isolations	3.6	1
239002 SRVs	08											Automatic depressurization system	4	1
259002 Reactor Water Level Control									06			Reactor water level setpoint setdown following a reactor scram: Plant-Specific	3	1
261000 SGTS	08					01						Process radiation monitoring system ; A.C. electrical distribution	2.8; 2.9	2
262001 AC Electrical Distribution											01 10	Knowledge of conditions and limitations in the facility license.	2.7	1
262002 UPS (AC/DC)			10	01								Containment isolation: Plant-Specific; Transfer from preferred power to alternate power supplies	2.7; 3.1	2
263000 DC Electrical Distribution	02		01									Battery charger and battery; Emergency generators: Plant-Specific	3.2; 3.4	2
264000 EDGs					06			04				Load sequencing; Consequences of operating under/over excited	3.4; 2.9	2
300000 Instrument Air		01										Instrument air compressor	2.8	1
400000 Component Cooling Water				01								Automatic start of standby pump	3.4	1
K/A Category Totals:	3	2	4	4	1	2	3	1	3	2	1	Group Point Total:		26

ES-401 BWR Examination Outline Form ES-401-1

Plant Systems - Tier 2/Group 2 (RO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic														0
201002 RMCS				03								Detection of drifting control rods	3.6	1
201003 Control Rod and Drive Mechanism														0
201004 RSCS														0
201005 RCIS														0
201006 RWM				01								Insert blocks/errors: P-Spec(Not-BWR6)	3.4	1
202001 Recirculation														0
202002 Recirculation Flow Control			05									Recirculation pump speed: Plant-Specific	3.2	1
204000 RWCU						07						SBLC logic	3.3	1
214000 RPIS														0
215001 Traversing In-core Probe														0
215002 RBM					01							Trip reference selection: Plant-Specific	2.6	1
216000 Nuclear Boiler Inst.														0
219000 RHR/LPCI: Torus/Pool Cooling Mode						06						Suppression pool	3.7	1
223001 Primary CTMT and Aux.														0
226001 RHR/LPCI: CTMT Spray Mode											01 20	Ability to execute procedure steps.	4.3	1
230000 RHR/LPCI: Torus/Pool Spray Mode														0
233000 Fuel Pool Cooling/Cleanup														0
234000 Fuel Handling Equipment														0
239001 Main and Reheat Steam														0
239003 MSIV Leakage Control														0
241000 Reactor/Turbine Pressure Regulator							08					Control/governor valve position	3.3	1
245000 Main Turbine Gen. / Aux.														0
256000 Reactor Condensate														0
259001 Reactor Feedwater								07				Reactor water level control system malfunctions	3.7	1
268000 Radwaste														0
271000 Offgas														0
272000 Radiation Monitoring										01		Recorder indications	2.9	1
286000 Fire Protection														0
288000 Plant Ventilation														0
290001 Secondary CTMT	02											Primary containment system: Plant-Specific	3.4	1
290003 Control Room HVAC									01			Initiation/reconfiguration	3.3	1
290002 Reactor Vessel Internals														0
K/A Category Totals:	1	0	1	2	1	2	1	1	1	1	1	Group Point Total:		12

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

Facility Name: Date of Exam:

Category	K/A #	Topic	RO		SRO	
			IR	#		
1. Conduct of Operations	2.1. 19	Ability to use plant computer to obtain and evaluate parametric information on system or co	3	1		
	2.1. 21	Ability to obtain and verify controlled procedure copy.	3.1	1		
	2.1. 25	Ability to obtain and interpret station reference materials such as graphs, monographs, and	2.8	1		
	2.1.					
	2.1.					
	2.1.					
	Subtotal			3		
2. Equipment Control	2.2. 22	Knowledge of limiting conditions for operations and safety limits.	3.4	1		
	2.2. 27	Knowledge of the refueling process.	2.6	1		
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal			2		
3. Radiation Control	2.3. 04	Knowledge of radiation exposure limits and contamination control, including permissible lev	2.5	1		
	2.3. 09	Knowledge of the process for performing a containment purge.	2.5	1		
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	Subtotal			2		
4. Emergency Procedures / Plan	2.4. 22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operat	3	1		
	2.4. 47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the app	3.4	1		
	2.4. 46	Ability to verify that the alarms are consistent with the plant conditions.	3.5	1		
	2.4.					
	2.4.					
	2.4.					
	Subtotal			3		
Tier 3 Point Total				10		

ES-401	BWR Examination Outline							Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)								
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4									0
295003 Partial or Complete Loss of AC / 6					02		Reactor power, pressure, and level	4.3	1
295004 Partial or Total Loss of DC Pwr / 6									0
295005 Main Turbine Generator Trip / 3									0
295006 SCRAM / 1						1.12	Ability to apply technical specifications for a system.	4	1
295016 Control Room Abandonment / 7					03		Reactor pressure	4.4	1
295018 Partial or Total Loss of CCW / 8									0
295019 Partial or Total Loss of Inst. Air / 8									0
295021 Loss of Shutdown Cooling / 4					01		Reactor water heatup/cooldown rate	3.6	1
295023 Refueling Acc / 8					02		Fuel pool level	3.7	1
295024 High Drywell Pressure / 5									0
295025 High Reactor Pressure / 3									0
295026 Suppression Pool High Water Temp. / 5						2.23	Ability to track limiting conditions for operations.	3.8	1
295027 High Containment Temperature / 5									0
295028 High Drywell Temperature / 5									0
295030 Low Suppression Pool Wtr Lvl / 5						4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4	1
295031 Reactor Low Water Level / 2									0
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1									0
295038 High Off-site Release Rate / 9									0
600000 Plant Fire On Site / 8									0
K/A Category Totals:	0	0	0	0	4	3	Group Point Total:		7

ES-401	BWR Examination Outline								Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3									0
295007 High Reactor Pressure / 3									0
295008 High Reactor Water Level / 2					01		Reactor water level	3.9	1
295009 Low Reactor Water Level / 2									0
295010 High Drywell Pressure / 5									0
295011 High Containment Temp / 5									0
295012 High Drywell Temperature / 5									0
295013 High Suppression Pool Temp. / 5									0
295014 Inadvertent Reactivity Addition / 1									0
295015 Incomplete SCRAM / 1									0
295017 High Off-site Release Rate / 9									0
295020 Inadvertent Cont. Isolation / 5 & 7					01		Drywell/containment pressure	3.7	1
295022 Loss of CRD Pumps / 1						1.20	Ability to execute procedure steps.	4.2	1
295029 High Suppression Pool Wtr Lvl / 5									0
295032 High Secondary Containment Area Temperature / 5									0
295033 High Secondary Containment Area Radiation Levels / 9									0
295034 Secondary Containment Ventilation High Radiation / 9									0
295035 Secondary Containment High Differential Pressure / 5									0
295036 Secondary Containment High Sump/Area Water Level / 5									0
500000 High CTMT Hydrogen Conc. / 5									0
K/A Category Totals:	0	0	0	0	2	1	Group Point Total:		3

ES-401 BWR Examination Outline Form ES-401-1

Plant Systems - Tier 2/Group 1 (SRO)

E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection														0
205000 Shutdown Cooling Mode								0 8				Loss of heat exchanger cooling	3.5	1
206000 HPCI								1 0				System isolation: BWR-2, 3, 4	4.1	1
207000 Isolation (Emergency) Condenser														0
209001 LPCS														0
209002 HPCS														0
211000 SLC											4 0 6	Knowledge symptom based EOP mitigation strategies.	4	1
212000 RPS														0
215003 IRM														0
215004 Source Range Monitor														0
215005 APRM / LPRM														0
217000 RCIC														0
218000 ADS								0 3				Loss of air supply to ADS valves: Plant-Specific	3.6	1
223002 PCIS/Nuclear Steam Supply Shutoff														0
239002 SRVs														0
259002 Reactor Water Level Control														0
261000 SGTS														0
262001 AC Electrical Distribution														0
262002 UPS (AC/DC)														0
263000 DC Electrical Distribution														0
264000 EDGs											2.2 4	Ability to analyze the affect of maintenance activities on LCO	3.8	1
300000 Instrument Air														0
400000 Component Cooling Water														0
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	Group Point Total:		5

ES-401 BWR Examination Outline Form ES-401-1

Plant Systems - Tier 2/Group 2 (SRO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic														0
201002 RMCS														0
201003 Control Rod and Drive Mechanism														0
201004 RSCS														0
201005 RCIS														0
201006 RWM														0
202001 Recirculation														0
202002 Recirculation Flow Control														0
204000 RWCU								01				Loss of component cooling water	3.4	1
214000 RPIS														0
215001 Traversing In-core Probe														0
215002 RBM														0
216000 Nuclear Boiler Inst.											4.2 2	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4	1
219000 RHR/LPCI: Torus/Pool Cooling Mode														0
223001 Primary CTMT and Aux.														0
226001 RHR/LPCI: CTMT Spray Mode														0
230000 RHR/LPCI: Torus/Pool Spray Mode														0
233000 Fuel Pool Cooling/Cleanup											3.1 0	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
234000 Fuel Handling Equipment														0
239001 Main and Reheat Steam														0
239003 MSIV Leakage Control														0
241000 Reactor/Turbine Pressure Regulator														0
245000 Main Turbine Gen. / Aux.														0
256000 Reactor Condensate														0
259001 Reactor Feedwater														0
268000 Radwaste														0
271000 Offgas														0
272000 Radiation Monitoring														0
286000 Fire Protection														0
288000 Plant Ventilation														0
290001 Secondary CTMT														0
290003 Control Room HVAC														0
290002 Reactor Vessel Internals														0
K/A Category Totals:	0	0	0	0	0	0	0	1	0	0	2	Group Point Total:		3

Facility Name: Date of Exam:

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1. 14	Knowledge of system status criteria which require the notification of plant personnel.			3.3	1
	2.1. 06	Ability to supervise and assume a management role during plant transients and upset conditions.			4.3	1
	2.1.					
	2.1.					
	2.1.					
	2.1.					
	Subtotal					2
2. Equipment Control	2.2. 17	Knowledge of the process for managing maintenance activities during power operations.			3.5	1
	2.2. 32	Knowledge of the effects of alterations on core configuration.			3.3	1
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal					2
3. Radiation Control	2.3. 1	Knowledge of 10 CFR 20 and related facility radiation control requirements.			3	1
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	Subtotal			0		1
4. Emergency Procedures / Plan	2.4. 1	Knowledge of EOP entry conditions and immediate action steps.			4.6	1
	2.4. 45	*Ability to prioritize and interpret the significance of each annunciator or alarm.*			3.6	1
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal			0		2
Tier 3 Point Total				0		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
SRO 1 / 1	295024EA2.02	K/A 295020AA2.01 (Existing K/A) and K/A29524EA2.02 (Replaced K/A) test very similar topic areas. Writing questions on both very similar K/As will result in double jeopardy for both questions. K/A 295023AA2.02 was randomly selected to replace K/A 295024EA2.02
SRO 2 / 1	263000A2.01	After many attempts to write an exam question on this K/A, the exam team was unable to create a question that would satisfy the K/A requirements K/A 206000A2.10 was randomly selected to replace K/A 263000A2.01

Facility: Limerick Generating Station Date of Examination: 01/10/2005
Examination Level (circle one): RO Operating Test Number: _____

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations		
Conduct of Operations	(N)(S) (P)	2.1.10 Interpretation and Application of Overtime Limits
Equipment Control	(N)(S)	2.2.12 Review a Control Rod Exercise Test
Radiation Control	(N)(S)	2.3.10 Calculate Stay Time
Emergency Plan	(N)(S)	2.4.27 Activate the Fire Brigade

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 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: Limerick Generating Station Date of Examination: 01/10/05
Examination Level (circle one): SRO Operating Test Number: _____

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	(N)(S)	2.1.3 Complete a Turnover Checklist
Conduct of Operations	(N)(S) (P)	2.1.10 Interpretation and Application of Overtime Limits
Equipment Control	(N)(S)	2.2.12 Review a Control Rod Exercise Test
Radiation Control	(N)(S)	2.3.10 Calculate Stay Time
Emergency Plan	(N)(S)	2.4.41 ERP Classification and Reporting, Loss of DC Power (SRO)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 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: Limerick Generating Station — Date of Examination: 01/10/2005

Exam Level (circle one): RO — Operating Test Number: _____

Control Room Systems@ (8 for RO, 7 for SRO-I, 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Reactor Recirc / Start MG Set – High Vibration occurs / 202001 A3.02	(A)(N)(S)(L)	1
b. Feedwater / Place 3rd RFP In Service / 259001 A4.02	(D)(S)	2
c. Main Turbine / ST-6-001-660-1 Main Turbine CIV, Stop Valve RPS EOC/RPT Channel Functional Test / 241000 K4.05	(N)(S)	3
d. RHR / Shutdown Cooling Flow Adjustments (RHRSW High Rad) / 205000 K1.15	(A)(D)(S)(L)(P)	4
e. Containment / T-228 Drywell Inerting with Nitrogen / 500000 EA1.07	(A)(N)(S)	5
f. A. C. Power / Supplying Power to a 480 VAC Non-Safeguard Load Center from its alternate source 262001 A2.10	(A)(N)(S)	6
g. RPS / Scram Channel A1 and A2 Functional Test / 212000 K4.05	(D)(S)	7
h. MCR HVAC / Manually Initiate a Control Room Chlorine Isolation / 290003 A3.01	(D)(S)	9

In-Plant Systems@ (3 for RO, 3 for SRO-I, 3 or 2 for SRO-U)

i. HCU / Scram Discharge Volume Draining 295015 AA1.01	(R)(D)(E)	1
j. UPS / Bypassing and Removing the *A RPS and UPS Static Inverter from Service 262002 K6.02	(R)(D)	6
k. SRV / Inadvertent Opening of a Relief Valve 239002 A2.03	(P)(R)(D)(E)	3

@ 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	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥1 / ≥1
(L)ow-Power	≥ 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: Limerick Generating Station Date of Examination: 01/10/2005

Exam Level (circle one): SRO(I) Operating Test Number: _____

Control Room Systems@ (8 for RO, 7 for SRO-I, 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Reactor Recirc / Start MG Set – High Vibration occurs / 202001 A3.02	(A)(N)(S)(L)	1
b. Feedwater / Place 3rd RFP In Service / 259001 A4.02	(D)(S)	2
c. Main Turbine / ST-6-001-660-1 Main Turbine CIV, Stop Valve RPS EOC/RPT Channel Functional Test / 241000 K4.05	(N)(S)	3
d. RHR / Shutdown Cooling Flow Adjustments (RHRSW High Rad) / 205000 K1.15	(A)(D)(S)(L)(P)	4
e. Containment / T-228 Drywell Inerting with Nitrogen / 500000 EA1.07	(A)(N)(S)	5
f. A. C. Power / Supplying Power to a 480 VAC Non-Safeguard Load Center from its alternate source 262001 A2.10	(A)(N)(S)	6
g. RPS / Scram Channel A1 and A2 Functional Test / 212000 K4.05	(D)(S)	7
h.		

In-Plant Systems@ (3 for RO, 3 for SRO-I, 3 or 2 for SRO-U)

i. HCU / Scram Discharge Volume Draining 295015 AA1.01	(R)(D)(E)	1
j. UPS / Bypassing and Removing the *A RPS and UPS Static Inverter from Service 262002 K6.02	(R)(D)	6
k. SRV / Inadvertent Opening of a Relief Valve 239002 A2.03	(R)(D)(E)(P)	3

@ 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	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥1 / ≥1
(L)ow-Power	≥ 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: Limerick Generating Station — Date of Examination: 01/10/2005

Exam Level (circle one): SRO(U) — Operating Test Number: _____

Control Room Systems@ (8 for RO, 7 for SRO-I, 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. RHR / Shutdown Cooling Flow Adjustments (RHRSW High Rad) / 205000 K1.15	(A)(D)(S)(L)(P)	4
b. Containment / T-228 Drywell Inerting with Nitrogen / 500000 EA1.07	(A)(N)(S)	5
c. A. C. Power / Supplying Power to a 480 VAC Non-Safeguard Load Center from its alternate source 262001 A2.10	(A)(N)(S)	6
d.		
e.		
f.		
g.		
h.		

In-Plant Systems@ (3 for RO, 3 for SRO-I, 3 or 2 for SRO-U)

i. HCU / Scram Discharge Volume Draining 295015 AA1.01	(R)(D)(E)	1
j. SRV / Inadvertent Opening of a Relief Valve 239002 A2.03	(R)(D)(E)(P)	3
k.		

@ 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	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥1 / ≥1
(L)ow-Power	≥ 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: Limerick Scenario No.: 1 Op-Test No.:_____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 4% power, Reactor Startup in progress, "1B" EHC pump blocked for maintenance

Turnover: A Reactor Startup is in progress with GP-2, Normal Plant Startup completed up to and including step 3.4.15. Reactor power is approximately 4%. RCIC is being operating for ST-6-049-230-1, RCIC Pump Valve and Flow Test, and RT-6-049-701-1 (step 4.4.30) should be completed within the next hour. "1B" EHC pump is blocked for maintenance, and will be out of service until a new pressure compensator arrives tomorrow.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO/ CRS)	Withdraw control rods until 4 bypass valves open
2	Override FIC46-1R600 flow controller pot to 0	I (RO/ CRS)	CRD flow controller fails downscale in AUTO
3	MED280B	I (ALL)	Loss of 1BY160 due to underfrequency trip of a series supply breaker (TS)
4	MRD016F	C (RO/ CRS)	Control Rod 22-35 inadvertently scrams (TS)
5	MRC465 (0-5%)	M (ALL)	Steam Leak from RCIC piping
6	MRC464A MRC464B	C (PRO/ CRS)	RCIC isolation valves fail to close
7	MAD141D	C (PRO/ CRS)	"1E" SRV fails to open

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

Facility: Limerick Scenario No.: 2 Op-Test No.:_____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 100% power, #3 APRM is inoperable and bypassed

Turnover: Reactor power is 100%. #3 APRM is inoperable and bypassed. I&C has been contacted to begin troubleshooting. The crew is to perform ST-6-001-761-1, Main Turbine Bypass Valve Exercising.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (ALL)	Perform ST-6-001-761-1
2	MCW483B MCW485A	I (ALL)	"1B" RECW pump trips, "1A" RECW pump fails to auto start
3	MED263D	I (PRO/ CRS)	D14 Bus Lockout relay fails, Loss of D14 Bus (TS)
4	MRR433B MRR434B	C (ALL)	"1B" Reactor Recirculation Pump seal failure (TS)
5	MRR441 (0-50 gpm)	C (ALL)	Leakage past "1B" Reactor Recirculation loop isolation valves
6	MRR440B	M (ALL)	"1B" Reactor Recirculation piping break
7	MRH171B	C (ALL)	"1B" RHR pump trip
8	MRH174C	C (PRO/ CRS)	"1C" RHR LPCI injection valve fails to close after it opens

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

Facility: Limerick Scenario No.: 3 Op-Test No.:_____

Examiners: _____ Operators: _____

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_____ _____

Initial Conditions: 100% power, "1K" SRV tailpipe temperature is elevated, and is being monitored using RT-6-041-230-1, MSRV Tailpipe Temperature Data Monitoring.

Turnover: Reactor power is 100%. "1K" SRV tailpipe temperature is elevated, and is being monitored using RT-6-041-230-1. The crew is to perform ST-6-047-200-1, SDV Valve Exercise Test.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (ALL)	Perform ST-6-047-200-1
2	MCR414C	C (RO/ CRS)	Scram discharge volume drain valve XV47-1F181 fails closed/ SDV High Level (TS)
3	MRM019A	I (PRO/ CRS)	U/1 RHRSW Radiation Monitor fails inoperable (TS)
4	MVI234A	I (RO/ CRS)	Reactor Pressure Instrument fails high
5	MRD556	M (ALL)	ATWS – Control Rods fail to scram (Hydraulic Lock)
6	MSL559	C (RO/ CRS	SLC piping rupture
7	MEH104B	I (ALL)	EHC Turbine Load Set runs back to minimum
8	MEH108	C (ALL)	Main Turbine Bypass Valves fail closed

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

Facility: Limerick Scenario No.: 4 Op-Test No.:_____

Examiners: _____ Operators: _____

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_____ _____

Initial Conditions: 83% power, ST-6-052-232-1, B Loop Core Spray Pump, Valve and Flow Test is in progress.

Turnover: Reactor power is 83% following a rod pattern adjustment. Reactor Engineering is completing a ReMA. Power restoration will resume within the next hour. ST-6-052-232-1, B Loop Core Spray Pump, Valve and Flow Test is in progress and has been completed up to and including step 4.7.21. "1D" Core Spray pump has been running for 20 minutes of its required 45 minutes for step 4.7.22.

Event No.	Malf. No.	Event Type*	Event Description
1	MVI231 B	I (ALL)	RPV instrument line break, XV42-1F045B closes causing Division 2 LOCA signal (TS)
2	MSW489B	C (PRO/ CRS)	"0B" ESW Pump trip (TS)
3	MHP452 MHP453	C (PRO/ CRS)	HPCI Injection valves will fail to reopen after initial isolation/trip of HPCI
4	Override HS05-102C to close	C (ALL)	"1C" Condensate Pump Discharge Valve strokes closed due to a short in the control switch
5	MRR507A	I (PRO/ CRS)	"1A" Reactor Recirculation MG Set fails to runback
6	MFW252B (0-100%)	M (ALL)	Feedwater line rupture inside Primary Containment
7	MAD146B MAD146E	C (PRO/ CRS)	"1K" SRV opens
8	Override HS41-1F032B to fail "as-is"	C (ALL)	"B" Feedwater line isolation valve fails to close
9	MAD151D	C (PRO/ CRS)	"1E" SRV downcomer leak

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