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Limerick Generating Station
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Exelon Nuclear

NUREG 1021

July 17, 2002

Mr. H. J Miller
U.S. NRC Region I Administrator
475 Allendale Road
King of Prussia, PA 19406

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Integrated Initial License Training Examination Outline

Dear Sir:

In accordance with NUREG 1021, Revision 8, "Operating Licensing Examination Standards for Power Reactors", Limerick Generating Station is submitting the integrated initial license training examination outline. This submittal supports the initial license examination scheduled for the week of October 7, 2002.

In accordance with NUREG 1021, Revision 8, Section ES-201, please ensure that these materials are withheld from public disclosure until after the examinations are complete.

Should you have any questions concerning this letter or the examination outlines, please contact Jeff Stevens at (610) 718-4084.

Sincerely,

Timothy A. O'Malley
Facility Representative/Senior Reactor Operator
Limerick Generating Station

Enclosure: (Hand delivered to Paul Bissett, Chief Examiner, NRC Region I)
ES-201-2, Examination Outline Quality Checklist
ES-201-3, Examination Security Agreements
ES-301-1, Administrative Topics Outline
ES-301-2, Control Room Systems and Facility Walk-Through Test Outline
~~ES-301-5, Transient and Event Checklist~~ /5
ES-401-1, BWR SRO Examination Outline
ES-401-2, BWR RO Examination Outline
ES-D-1, Scenario Outlines

cc: USNRC Document Control Desk (w/o encl.)
A. L. Burritt, USNRC Senior Resident Inspector, LGS (w/o encl)

bcc: R. Braun GML 5-1(w/o encl.)
A. Wasong LTC 1-1(w/o encl.)
C. Rich Jr. LTC 1-1(w/o encl.)
J. Stevens LTC 1-1 (w/o encl.)
M. Kaminski SSB 2-4 (w/o encl.)
W. Levis GML 5-1 (w/o encl.)
W. O'Malley GML 5-1 (w/o encl.)

Facility: Limerick Generating Station Date of Exam: 10/07/02 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	2	3	3				3	1			1	13
	2	2	3	2				5	6			1	19
	3	1	1	1				1	0			0	4
	Tier Totals	5	7	6				9	7			2	36
2. Plant Systems	1	1	3	3	3	2	2	3	4	4	2	1	28
	2	2	0	4	3	2	3	1	1	0	2	1	19
	3	0	0	0	0	0	1	0	1	0	2	0	4
	Tier Totals	3	3	7	6	4	6	4	6	4	6	2	51

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	3	3	3	4	13

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).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6.* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the 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.

ES-401	BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1						Form ES-401		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
295005 Main Turbine Generator Trip / III				74R			AA1.05 Reactor/turbine pressure regulating system	3.6	1
295006 SCRAM / I			10				AK3.03 Reactor pressure response	3.8	1
295007 High Reactor Pressure / III			42				AK3.03 RCIC operation: Plt. Sp.	3.4	1
295009 Low Reactor Water Level / II		43					AK2.02 Reactor water level control	3.9	1
295010 High Drywell Pressure / V			92				AK3.01 Drywell venting	3.8	1
295014 Inadvertent Reactivity Addition / I	44			45			AK1.05 Fuel thermal limits AA1.02 Recirculation flow control system	3.7 3.6	1 1
295015 Incomplete SCRAM / I		46					AK2.01 CRD Hydraulics	3.8	1
295024 High Drywell Pressure / V						47	2.1.23 Ability to perform specific system and integrated plant procedures during different modes of plant operation	3.9	1
295025 High Reactor Pressure / III		93					EK2.04 ARI/RPT/ATWS: Plt. Sp.	3.9	1
295031 Reactor Low Water Level / II				48			EA1.06 Automatic depressurization system	4.4	1
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / I					49		EA2.02 Reactor water level	4.1	1
500000 High Containment Hydrogen Conc. / V	50						EK1.01 Containment integrity	3.3	1
K/A Category Totals:	**2**	**3**	**3**	**3**	**1**	**1**	**Group Point Total:**		**13**

Numbers Denote Exam Question Number.
"R" – RO Only; All others – Common with SRO Exam

ES-401	BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2						Form ES-401-2		
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	76						AK1.02 Power/flow distribution	3.3	1
295002 Loss of Main Condenser Vacuum / III	77						AK1.04 Increased offgas flow	3.0	1
295003 Partial or Complete Loss of AC Pwr / VI					94		AA2.02 Reactor power, pressure, and level	4.2	1
295004 Partial or Complete Loss of DC Pwr / VI				95			AA1.02 Systems necessary to assure safe plant shutdown	3.8	1
295008 High Reactor Water Level / II		78					AK2.08 Main turbine: Plt. Sp.	3.4	1
295009 High RCS Temperature / V									
295012 High Drywell Temperature / V		96					AK2.01 Drywell ventilation	3.4	1
295013 High Suppression Pool Temp. / V		97					AK2.01 Suppression pool cooling	3.6	1
295016 Control Room Abandonment / VII									
295017 High Off-site Release Rate / IX				79			AA1.04 Stack gas monitoring system: Plt. Sp.	3.6	1
295018 Partial or Complete Loss of CCW / VIII					75R		AA2.01 Component temperatures	3.3	1
295019 Partial or Complete Loss of Inst. Air / VIII				80			AA1.01 Backup air supply	3.5	1
295020 Inadvertent Cont. Isolation / V & VII				98			AA1.02 Drywell ventilation/cooling system	3.2	1
295022 Loss of CRD Pumps / I			81				AK3.01 Reactor SCRAM	3.7	1
295026 High Suppression Pool Water Temp. / V			82				EK3.04 SBLC injection	3.7	1
295027 High Containment Temperature / V									
295028 High Drywell Temperature / V						99	2.1.32 Ability to explain and apply system limits and precautions	3.4	1
295029 High Suppression Pool Water Level / V					83		EA2.03 Drywell/containment water level	3.4	1
295030 Low Suppression Pool Water Level / V					84		EA2.04 Drywell/suppression chamber differential pressure: Marl II&III	3.5	1
295033 High Secondary Containment Area Radiation Levels / IX					85		EA2.01 Area radiation levels	3.8	1
295034 Secondary Containment Ventilation High Radiation / IX									
295038 High Off-site Release Rate / IX				86			EA1.06 Plant ventilation	3.5	1
600000 Plant Fire On Site / VIII					87		AA2.04 The fire's extent of potential operational damage to plant equipment	2.8	1
K/A Category Point Totals:	**2**	**3**	**2**	**5**	**6**	**1**	**Group Point Total:**		**19**

Numbers Denote Exam Question Number.
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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	100						AK1.04 Natural circulation	3.6	1
295023 Refueling Accidents / VIII									
295032 High Secondary Containment Area Temperature / V			88				EK3.01 Emergency/normal depressurization	3.5	1
295035 Secondary Containment High Differential Pressure / V		89					EK2.04 Blow-out panels: Plt. Sp.	3.3	1
295036 Secondary Containment High Sump/Area Water Level / V				90			EA1.01 Secondary containment and floor drain systems	3.2	1
K/A Category Point Totals:	**1**	**1**	**1**	**1**	**0**	**0**	**Group Point Total:**		**4**

Numbers Denote Exam Question Number.
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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										1		A4.04 Drive water pressure control valve	3.1	1
201002 RMCS								11				A2.04 Control rod block	3.2	1
201005 RCIS														
202002 Recirculation Flow Control								12				A2.01 Recirculation pump trip	3.4	1
									51R			A3.03 Scoop tube operation: BWR 2,3,4	3.1	1
203000 RHR/LPCI: Injection Mode								13				A2.04 A.C. failures	3.5	1
									52R			A3.08 System initiation sequence	4.1	1
206000 HPCI					14							K5.08 Vacuum breaker operation:BWR-2,3,4	3.0	1
207000 Isolation (Emerg.) Condenser														
209001 LPCS		15										K2.03 Initiation logic	2.9	1
209002 HPCS														
211000 SLC							2					A1.10 Lights and alarms	3.7	1
212000 RPS				3								K4.05 Functional testing of the system while maintaining power operation	3.4	1
215003 IRM			53R									K3.02 Reactor manual control	3.6	1
215004 SRM								16				A2.04 Upscale and downscale trips	3.5	1
											17	2.1.30 Ability to locate and operate components, including local controls	3.9	1
215005 APRM / LPRM		18										K2.02 APRM channels	2.6	1
216000 Nuclear Boiler Instrumentation			19									K3.29 Jet pump flow monitoring: Plt. Sp.	3.1	1
217000 RCIC									20			A3.02 Turbine startup	3.6	1
				54R								K4.04 Prevents turbine damage: Plt Sp.	3.0	1
218000 ADS						21						K6.07 Primary containment instrumentation	3.4	1
223001 Primary CTMT and Auxiliaries		22										K2.09 Drywell cooling fans: Plt. Sp.	2.7	1
223002 PCIS/Nuclear Steam Supply Shutoff				23								K4.08 Manual defeating of selected isolations during specified emergency conditions	3.3	1
							55R					A1.03 SPDS/ERIS/CRIDS/GDS: Plt. Sp.	2.5	1
239002 SRV's										4		A4.01 SRVs	4.4	1
241000 Reactor/Turbine Pressure Regulator						24						K6.17 Main turbine PMG: Plt. Sp.	2.7	1
259001 Reactor Feedwater									25			A3.03 System flow	3.3	1
259002 Reactor Water Level Control	5											K1.05 Reactor Feedwater system	3.6	1
					56R							K5.01GEMAC/Foxboro/Bailey controller operation: Plt. Sp.	3.1	1
261000 SGTS			26									K3.05 Secondary containment radiation/contamination levels	3.2	1
264000 EDG's							27					A1.09 Maintaining minimum load on emergency generator (to prevent reverse power)	3.0	1
K/A Category Point Totals:	**1**	**3**	**3**	**3**	**2**	**2**	**3**	**4**	**4**	**2**	**1**	**Group Point Total:**		**28**

Numbers Denote Exam Question Number.
"R" – RO Only; All others – Common with SRO Exam

ES-401	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										6		A4.02 CRD mechanism position: Plt. Sp.	3.5	1
201004 RSCS														
201006 RWM					28							K5.10 Withdraw error: Plt. Sp (Not BWR6)	3.2	1
202001 Recirculation				57R								K4.06 Automatic voltage/frequency regulation : Plt Sp.	2.6	1
204000 RWCU	58R											K1.15 Leak Detection: Plt. Sp.	2.6	1
205000 Shutdown Cooling					29							K5.02 Valve operation	2.8	1
214000 RPIS	30											K1.05 Full core display: Plt. Sp.	3.3	1
215002 RBM											31	2.4.31 Knowledge of annunciators, alarms, and indications, and the use of the response instructions	3.3	1
219000 RHR/LPCI: Torus/Pool Cooling Mode			32									K3.01 Suppression pool temperature control	3.9	1
226001 RHR/LPCI: CTMT Spray Mode						33						K6.05 Suppression pool (temperature, level, and pressure)	3.4	1
230000 RHR/LPCI: Torus/Pool Spray Mode								34				A2.04 Valve openings	2.8	1
239001 Main and Reheat Steam							35					A1.06 Air ejector process radiation monitor	3.4	1
245000 Main Turbine Gen. and Auxiliaries			59R									K3.07 Reactor protection system	3.6	1
256000 Reactor Condensate				7								K4.08 Dedicated ECCS water supply: Plt. Sp.	3.6	1
262001 AC Electrical Distribution			60R									K3.11 MSIVs: Plt. Sp.	2.8	1
262002 UPS (AC/DC)														
263000 DC Electrical Distribution			8									K3.02 Components using D.C. control power (i.e. breakers)	3.5	1
271000 Offgas						61R						K6.09 Fuel cladding integrity	3.4	1
272000 Radiation Monitoring				36								K4.02 Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	3.7	1
286000 Fire Protection														
290001 Secondary CTMT						9						K6.08 Plant air systems	2.7	1
290003 Control Room HVAC										62R		A4.01 Initiate/Reset system	3.2	1
300000 Instrument Air														
400000 Component Cooling Water														
K/A Category Point Totals:	**2**	**0**	**4**	**3**	**2**	**3**	**1**	**1**	**0**	**2**	**1**	**Group Point Total:**		**19**

Numbers Denote Exam Question Number.
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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														
233000 Fuel Pool Cooling and Cleanup						63R						K6.10 Reactor cavity seal failure	2.9	1
234000 Fuel Handling Equipment										37		A4.01 Neutron monitoring system	3.7	1
239003 MSIV Leakage Control														
268000 Radwaste														
288000 Plant Ventilation										38		A4.01 Start and stop fans	3.1	1
290002 Reactor Vessel Internals								64R				A2.04 Excessive heatup/cooldown rate	3.7	1
K/A Category Point Totals:	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**2**	**0**	**Group Point Total:**		**4**

Numbers Denote Exam Question Number.
"R" – RO Only; All others – Common with SRO Exam

Facility: Limerick Generating Station	Date of Exam: 10/07/02		Exam Level: RO	
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.3	Knowledge of shift turnover practices 39	3.0	1
	2.1.25	Ability to obtain and interpret station reference material such as graphs, monographs, and tables which contain performance data 65R	2.8	1
	2.1.32	Ability to explain and apply system limits and precautions – 66R	3.4	1
	Total			3
Equipment Control	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels --40	4.0	1
	2.2.3	(Multi Unit) Knowedge of the design, procedural, and operational differences between units – 67R	3.1	1
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status – 68R	2.6	1
	Total			3
Radiation Control	2.3.1	Knowledge of 10CFR20 and related facility radiation control requirements -- 91	2.6	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized – 69R	2.5	1
	2.3.11	Ability to control radiation releases – 70R	2.7	1
	Total			3
Emergency Procedures and Plan	2.4.6	Knowledge of symptom based EOP mitigation strategies 41	3.1	1
	2.4.17	Knowledge of EOP terms and definitions- 71R	3.1	1
	2.4.48	Ability to interpret control room indications to verify the status and operation of systems and understand how operator actions and directives affect plant snd system conditions- 72R	3.5	1
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls – 73R	4.0	1
	Total			4
Tier 3 Point Total (RO)				**13**

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Tier/Group	Randomly Selected K/A	Reason for Rejection
1 / 1	295014AK1.03	GFE topic
1 / 1	295009AK3.02	Not applicable at LGS
1 / 1	295016AA1.02	Not applicable at LGS (MSIVs are closed as part of control room abandonment)
1 / 1	295006AK3.02	Does not support a question of acceptable discriminating value
1 / 2	295012AK1.02	Does not support question of acceptable discriminating value
2 / 1	2110002.4.49	SLC system has no immediate action steps driven from memory
2 / 1	211000A1.03	Does not support question of acceptable discriminating value
2 / 1	215004K5.01	GFE topic
2 / 1	261000A2.04	No procedure driven actions support a question of acceptable discriminating value
2 / 2	226001A3.01	Does not support a question of acceptable discriminating value
2 / 2	300000K5.13	Does not support a question of acceptable discriminating value
Generic	2.1.16	Does not support question of acceptable discriminating value
Generic	2.2.31	N/A at LGS. Covered under 2.2.28

Facility: Limerick Generating Station Date of Exam: 10/07/02 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	2	4	4				4	7			5	26
	2	3	3	2				4	3			2	17
	Tier Totals	5	7	6				8	10			7	43
2. Plant Systems	1	1	3	2	2	1	4	2	3	1	1	3	23
	2	1	0	2	1	2	0	0	2	1	2	2	13
	3	0	0	0	1	0	0	1	0	0	2	0	4
	Tier Totals	2	3	4	4	3	4	3	5	2	5	5	40

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	4	4	4	5	17

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).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6.* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the 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.

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

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					94		AA2.02 Reactor power, pressure, and level	4.3	1
295006 SCRAM / I			10				AK3.03 Reactor pressure response	3.9	1
295007 High Reactor Pressure / III			42				AK3.03 RCIC operation: Plt. Sp.	3.5	1
295009 Low Reactor Water Level / II		43					AK2.02 Reactor water level control	3.9	1
					67S		AA2.01 Reactor water level	4.2	1
295010 High Drywell Pressure / V			92				AK3.01 Drywell venting	4.0	1
295013 High Suppression Pool Temp. / V		97					AK2.01 Suppression pool cooling	3.7	1
					68S		AA2.01 Suppression pool temperature	4.0	1
295014 Inadvertent Reactivity Addition / I	44						AK1.05 Fuel thermal limits	4.2	1
				45			AA1.02 Recirculation flow control system	3.8	1
295015 Incomplete SCRAM / I		46					AK2.01 CRD Hydraulics	3.9	1
						69S	2.4.6 Knowledge symptom based EOP mitigation strategies	4.0	1
295016 Control Room Abandonment / VII						70S	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls	4.0	1
295017 High Off-site Release Rate / IX				79			AA1.04 Stack gas monitoring system: Plt. Sp.	3.8	1
295023 Refueling Accidents Cooling Mode / VIII						71S	2.2.22 Knowledge of limiting conditions for operation and safety limits	4.1	1
295024 High Drywell Pressure / V						47	2.1.23 Ability to perform specific system and integrated plant procedures during different modes of plant operation	4.0	1
					72S		EA2.03 Suppression pool level	3.8	1
295025 High Reactor Pressure / III		93					EK2.04 ARI/RPT/ATWS: Plt. Sp.	4.1	1
295026 Suppression Pool High Water Temp. / V			82				EK3.04 SBLC injection	4.1	1
					73S		EA2.02 Suppression pool level	3.9	1
295027 High Containment Temperature / V									
295030 Low Suppression Pool Water Level / V					84		EA2.04 Drywell/suppression chamber differential pressure: Marl II&III	3.7	1
295031 Reactor Low Water Level / II				48			EA1.06 Automatic depressurization system	4.4	1
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / I					49		EA2.02 Reactor water level	4.2	1
						74S	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls	4.0	1
295038 High Off-site Release Rate / IX				86			EA1.06 Plant ventilation	3.6	1
500000 High Containment Hydrogen Conc. / V	50						EK1.01 Containment integrity	3.9	1
K/A Category Totals:	**2**	**4**	**4**	**4**	**7**	**5**	**Group Point Total:**		**26**

Numbers Denote Exam Question Number.
"S" – SRO Only; All others – Common with RO Exam

ES-401	BWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2						Form ES-401-1	
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	76						AK1.02 Power/flow distribution	3.5	1
295002 Loss of Main Condenser Vacuum / III	77						AK1.04 Increased offgas flow	3.3	1
295004 Partial or Total Loss of DC Pwr / VI				95			AA1.02 Systems necessary to assure safe plant shutdown	4.1	1
295005 Main Turbine Generator Trip / III									
295008 High Reactor Water Level / II		78					AK2.08 Main turbine: Plt. Sp.	3.5	1
295010 High Containment Temperature / V									
295012 High Drywell Temperature / V		96					AK2.01 Drywell ventilation	3.5	1
295018 Partial or Total Loss of CCW / VIII									
295019 Partial or Total Loss of Inst. Air / VIII				80			AA1.01 Backup air supply	3.3	1
295020 Inadvertent Cont. Isolation / V & VII				98			AA1.02 Drywell ventilation/cooling system	3.2	1
295021 Loss of Shutdown Cooling / IV	100						AK1.04 Natural circulation	3.7	1
295022 Loss of CRD Pumps / I			81				AK3.01 Reactor SCRAM	3.9	1
295028 High Drywell Temperature / V						99	2.1.32 Ability to explain and apply system limits and precautions	3.8	1
295029 High Suppression Pool Water Level / V					83		EA2.03 Drywell/containment water level	3.5	1
295032 High Secondary Containment Area Temperature / V			88				EK3.01 Emergency/normal depressurization	3.8	1
295033 High Secondary Containment Area Radiation Levels / IX					85		EA2.01 Area radiation levels	3.9	1
295034 Secondary Containment Ventilation High Radiation / IX						75S	2.2.22 Knowledge of limiting conditions for operations and safety limits	4.1	1
295035 Secondary Containment High Differential Pressure / V		89					EK2.04 Blow-out panels: Plt. Sp.	3.7	1
295036 Secondary Containment High Sump/Area Water Level / V				90			EA1.01 Secondary containment and floor drain systems	3.3	1
600000 Plant Fire On Site / VIII					87		AA2.04 The fire's extent of potential operational damage to plant equipment	3.1	1
K/A Category Point Totals:	**3**	**3**	**2**	**4**	**3**	**2**	**Group Point Total:**		**17**

Numbers Denote Exam Question Number.
"S" – SRO Only; All others – Common with RO Exam

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
203000 RHR/LPCI: Injection Mode								13				A2.04 A.C. failures	3.6	1
206000 HPCI					14							K5.08 Vacuum breaker operation:BWR-2,3,4	3.2	1
209001 LPCS		15										K2.03 Initiation logic	3.1	1
211000 SLC							2					A1.10 Lights and alarms	3.7	1
212000 RPS				3								K4.05 Functional testing of the system while maintaining power operation	3.6	1
215004 Source Range Monitor								16				A2.04 Upscale and downscale trips	3.7	1
											17	2.1.30 Ability to locate and operate components, including local controls	3.4	1
215005 APRM / LPRM		18										K2.02 APRM channels	2.8	1
216000 Nuclear Boiler Instrumentation			19									K3.29 Jet pump flow monitoring: Plt. Sp.	3.2	1
217000 RCIC									20			A3.02 Turbine startup	3.5	1
218000 ADS						21						K6.07 Primary containment instrumentation	3.5	1
223001 Primary CTMT and Auxiliaries		22										K2.09 Drywell cooling fans: Plt. Sp.	2.9	1
223002 PCIS/Nuclear Steam Supply Shutoff				23								K4.08 Manual defeating of selected isolations during specified emergency conditions	3.7	1
											51S	2.4.6 Knowledge of symptom based EOP mitigation strategies	4.0	1
226001 RHR/LPCI: CTMT Spray Mode						33						K6.05 Suppression pool (temperature, level, and pressure)	3.6	1
239002 SRV's										4		A4.01 SRVs	4.4	1
241000 Reactor/Turbine Pressure Regulator						24						K6.17 Main turbine PMG: Plt. Sp.	2.8	1
259002 Reactor Water Level Control	5											K1.05 Reactor Feedwater system	3.7	1
261000 SGTS			26									K3.05 Secondary containment radiation/;contamination levels	3.5	1
262001 AC Electrical Distribution											52S	2.2.22 Knowedge of limiting conditions for operation and safety limits	4.1	1
264000 EDG's							27					A1.09 Maintaining minimum load on emergency generator (to prevent reverse power)	3.1	1
290001 Secondary CTMT						9						K6.08 Plant air systems	2.8	1
K/A Category Point Totals:	**1**	**3**	**2**	**2**	**1**	**4**	**2**	**3**	**1**	**1**	**3**	**Group Point Total:**		**23**

Numbers Denote Exam Question Number.
"S" – SRO Only; All others – Common with RO Exam

ES-401	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										1		A4.04 Drive water pressure control valve	3.0	1
201002 RMCS								11				A2.04 Control rod block	3.1	1
201004 RSCS														
201006 RWM					28							K5.10 Withdraw error: P-spec (Not BWR6)	3.3	1
202001 Recirculation														
204000 RWCU														
205000 Shutdown Cooling					29							K5.02 Valve operation	2.9	1
214000 RPIS	30											K1.05 Full core display: P-Spec	3.3	1
215002 RBM											31	2.4.31 Knowledge of annunciators, alarms, and indications, and the use of the response instructions	3.4	1
215003 IRM														
219000 RHR/LPCI: Torus/Pool Cooling Mode			32									K3.01 Suppression pool temperature control	4.1	1
230000 RHR/LPCI: Torus/Pool Spray Mode								34				A2.04 Valve openings	3.1	1
234000 Fuel Handling Equipment										37		A4.01 Neutron monitoring system	3.9	1
239003 MSIV Leakage Control														
245000 Main Turbine Gen. And Auxiliaries														
259001 Reactor Feedwater									25			A3.03 System flow	3.2	1
262002 UPS (AC/DC)														
263000 DC Electrical Distribution			8									K3.02 Components using D.C. control power (i.e. breakers)	3.5	1
271000 Offgas														
272000 Radiation Monitoring				36								K4.02 Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	4.1	1
286000 Fire Protection											53S	2.4.30 Knowledge of which events related to system operation/status should be reported to outside agencies	3.6	1
290003 Control Room HVAC														
300000 Instrument Air														
400000 Component Cooling Water														
K/A Category Point Totals:	**1**	**0**	**2**	**1**	**2**	**0**	**0**	**2**	**1**	**2**	**2**	**Group Point Total:**		**13**

Numbers Denote Exam Question Number.
"S" – SRO Only; All others – Common with RO Exam

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										6		A4.02 CRD mechanism position: Plt. Sp.	3.5	1
215001 Traversing In-core Probe														
233000 Fuel Pool Cooling and Cleanup														
239001 Main and Reheat Steam							35					A1.06 Air ejector process radiation monitor	3.4	1
256000 Reactor Condensate				7								K4.08 Dedicated ECCS water supply: Plt. Sp.	3.6	1
268000 Radwaste														
288000 Plant Ventilation										38		A4.01 Start and stop fans	2.9	1
290002 Reactor Vessel Internals														
K/A Category Point Totals:	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**Group Point Total:**		**4**

Numbers Denote Exam Question Number.
"S" – SRO Only; All others – Common with RO Exam

Facility: Limerick Generating Station	Date of Exam: 10/7/02	Exam Level: SRO		
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.3	Knowledge of shift turnover practices - 39	3.4	1
	2.1.10	Knowledge of conditions and limitations in the facility license – 54S	3.9	1
	2.1.22	Ability to determine Mode of Operation – 55S	3.3	1
	2.1.32	Ability to explain and apply system limits and precautions – 56S	3.8	1
	Total			4
Equipment Control	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels – 40	3.5	1
	2.2.11	Knowledge of the process for controlling temporary changes – 57S	3.4	1
	2.2.20	Knowledge of the process for managing troubleshooting activities – 58S	3.3	1
	2.2.26	Knowledge of refueling administrative requirements – 59S	3.7	1
	Total			4
Radiation Control	2.3.1	Knowledge of 10CFR20 and related facility radiation control requirements – 91	3.0	1
	2.3.2	Knowledge of the facility ALARA program- 60S	2.9	1
	2.3.4	Knowledge of radiation exposure limits and contamination controls, including permissible levels in excess of those specified – 61S	3.1	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure – 62S	3.3	1
	Total			4
Emergency Procedures and Plan	2.4.6	Knowledge of symptom based EOP mitigation strategies – 41	4.0	1
	2.4.32	Knowledge of operator responses to loss of all annunciators –63S	3.5	1
	2.4.33	Knowledge of the process used to track inoperable alarms –64S	2.8	1
	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator – 65S	4.0	1
	2.4.44	Knowledge of emergency plan protective action recommendations –66S	4.0	1
	Total			5
Tier 3 Point Total (SRO)				**17**

Numbers Denote Exam Question Number.
"S" – SRO Only; All others – Common with RO Exam

Facility: Limerick Generating Station		Date of Examination: 10/07/02
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	Process computer	2.1.19 (3.0) Ability to use plant computer to obtain and evaluate parametric information on system or component status JPM: Evaluate jet pump operability
	License Maintenance	2.1.4 (3.4) Knowledge of shift staffing requirements JPM: Determine status of license from working hour records
A.2	Safety Systems Status	2.2.10 (3.3) Knowledge of the process for determining the proposed change, test, or experiment increases the probability of occurrence or consequences of an accident during the change, test, or experiment JPM: Determine required compensatory actions for barrier breach (SRO ONLY)
A.3	Release Controls	2.3.3 (2.9) Knowledge of SRO responsibilities for auxiliary systems that are outside the control room JPM: Determine compensatory actions for a failed radiation monitor prior to a planned liquid release (SRO ONLY)
A.4	Emergency Plan	2.4.41 (4.1) Knowledge of emergency action level thresholds and classifications JPM: Evaluate plant conditions and determine EAL (SRO ONLY)

Facility: Limerick Generating Station		Date of Examination: 10/07/02
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	Process computer	2.1.19 (3.0) Ability to use plant computer to obtain and evaluate parametric information on system or component status JPM: Evaluate jet pump operability
	License Maintenance	2.1.4 (3.4) Knowledge of shift staffing requirements JPM: Determine status of license from working hour records
A.2	Partial Procedures	2.2.11 (2.5) Knowledge of the process for controlling temporary changes JPM: Partial procedure preparation
A.3	Release Control	2.3.11 (2.7) Ability to control radiation releases JPM: Determine offgas effluent activity release rate
A.4	Emergency Plan	2.4.29 (2.6) Knowledge of Emergency Plant procedures JPM: Activate the Site Evacuation Alarm and make station Announcement

Facility: Limerick Generating Station	Date of Examination: 10/07/02
Exam Level: SRO(I)	Operating Test No.: _____

B.1 Control Room Systems		
System / JPM Title	Type Code*	Safety Function
a. Manual Depressurization of RHR (Alternate Path – Drain Valve trips on thermals)	NAS	2
b. Operate RCIC Full Flow test CST to CST (Alternate Path – Test valve pressure locks)	NAS	4
c. Venting Primary Containment (OT-101) (Alternate Path – High Rad alarm annunciates)	NAS	5
d. Control Rod Exercise Test (ST-6-107-760-*)(Alternate Path – Rod uncouples)	NAS	1
e. Shutdown D14 Diesel Generator	MS	6
f. Bypass Isolations and Restore RECW (ON-113)	DS	8
g. Establish Main Condenser Vacuum Using the 2nd Stage SJAE	NSL	9
B.2 Facility Walk-Through		
a. Install SLC Squib Valve Bypass Line	DR	1
b. Defeat HPCI and RCIC High Temperature Isolation	DR	4
c. Supply Emergency DIV 1 Power to RCIC Inboard Isolation Valve	DR	6

* 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: 10/07/02
Exam Level: SRO(U)	Operating Test No.: _____

B.1 Control Room Systems

	System / JPM Title	Type Code*	Safety Function
a.	Operate RCIC Full Flow test CST to CST (Alternate Path – Test valve pressure locks)	NAS	4
b.	Venting Primary Containment (OT-101) (Alternate Path – High Rad alarm annunciates)	NAS	5
c.	Establish Main Condenser Vacuum Using the 2nd Stage SJAE	NSL	9
d.			
e.			
f.			
g.			

B.2 Facility Walk-Through

a.	Install SLC Squib Valve Bypass Line	DR	1
b.	Supply Emergency DIV 1 Power to RCIC Inboard Isolation Valve	DR	6
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: Limerick Generating Station	Date of Examination: 10/07/02
Exam Level: RO	Operating Test No.: _____

B.1 Control Room Systems			
	System / JPM Title	Type Code*	Safety Function
a.	Manual Depressurization of RHR (Alternate Path – Drain Valve trips on thermals)	NAS	2
b.	Operate RCIC Full Flow test CST to CST (Alternate Path – Test valve pressure locks)	NAS	4
c.	Venting Primary Containment (OT-101) (Alternate Path – High Rad alarm annunciates)	NAS	5
d.	Control Rod Exercise Test (ST-6-107-760-*) (Alternate Path – Rod uncouples)	NAS	1
e.	Shutdown D14 Diesel Generator	MS	6
f.	Bypass Isolations and Restore RECW (ON-113)	DS	8
g.	Establish Main Condenser Vacuum Using the 2nd Stage SJAE	NSL	9
B.2 Facility Walk-Through			
a.	Install SLC Squib Valve Bypass Line	DR	1
b.	Defeat HPCI and RCIC High Temperature Isolation	DR	4
c.	Supply Emergency DIV 1 Power to RCIC Inboard Isolation Valve	DR	6

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

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 100% Power

Turnover: "1M" SRV is leaking. Place "1A" RHR Loop in Suppression Pool Cooling (90% RMSI)

Event No.	Malf. No.	Event Type*	Event Description
1	MAD148A	N (CRS) (PRO)	Place Suppression Pool Cooling in Service
2	MHP451B	I (CRS) (PRO)	HPCI Inadvertent Isolation – Tech Spec
3	MFW046B	I (ALL)	"1B" FW Steam Flow Transmitter Fails Low
4	MFH522A MFH516A	C (ALL)	Loss of Feedwater Heating
5	N/A	R (ALL)	Power Reduction with Rods and Recirc to 85%
6	MAD148B MAD148C	C (ALL)	"1M" SRV fails open and will not close
7	MRP029C NRP407C	M (ALL)	ATWS (Electrical)
8	MSL196D	C (CRS) (PRO)	SLC Failure prevents SLC Injection

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

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

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 90% power

Turnover: Secure from drywell N2 makeup. (85% RMSI)

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (CRS) (PRO)	Secure from N2 Makeup
2	MRD016A	C (CRS) (RO)	Rod Drift / Thermal Limit Violation – Tech Spec
3	N/A	R (ALL)	Power Reduction To 80%
4	MCW483C	I (CRS) (PRO)	"1A" RECW pump trips, "1B" RECW fails to start
5	MRR433A MRR434A	C (ALL)	Both "1A" RRP Seals Fail
6	HS43-F031A	C (CRS) (PRO)	"1A" RRP Discharge Valve Fails Open
7	MRR440A	M (ALL)	Reactor Coolant Leak
8	MRH528C	C (CRS) (PRO)	"1A" Drywell Spray Valve Fails to Open
9	MRH171B	I (CRS) (PRO)	"1B" RHR Pump Fails to Start

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