

Facility:		Date of Exam:																
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	4	3	3	N/A			4	4	N/A			2	20			7	
	2	1	2	1				1	1				1	7			3	
	Tier Totals	5	5	4				5	5				3	27			10	
2. Plant Systems	1	2	1	1	5	3	3	2	3	3	1	2	26			5		
	2	0	1	1	1	1	2	1	1	1	1	2	12			3		
	Tier Totals	2	2	2	6	4	5	3	4	4	2	4	38			8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		2		2		3							

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 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/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 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. Refer to Section D.1.b of ES-401 for the applicable K/As.
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; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

295028 High Drywell Temperature / 5		X					AK2.04: Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: Drywell ventilation	3.6 3.6	14
295030 Low Suppression Pool Wtr Lvl / 5					X		EA2.02: Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Suppression pool temperature	3.9 3.9	15
295031 Reactor Low Water Level / 2		X					EK2.10: Knowledge of the interrelations between REACTOR LOW WATER LEVEL and Redundant Reactivity Control	4.0 4.0	16
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.07: Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Various alternate methods of control rod insertion	4.2 4.3	17
295038 High Off-site Release Rate / 9				X			EA1.01: Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE: Stack-gas monitoring system	3.9 4.2	18
600000 Plant Fire On Site / 8			X				AK3.04: Knowledge of the reasons for the following responses as they apply to PLANT FIRE ON SITE: Actions contained in the abnormal procedure for plant fire on site	2.8 3.4	19
700000 Generator Voltage and Electric Grid Disturbances / 6				X			AA1.03: Ability to operate and/or monitor voltage regulator controls as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES	3.8 3.7	20
K/A Category Totals:	4	3	3	4	4	2	Group Point Total:		20 /7

K/A Category Point Totals:	1	2	1	1	1	1		Group Point Total:		7/3

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-1	
System # / Name	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 Mode							X					A1.03: Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: INJECTION MODE controls including: System flow	3.8 3.7	28
205000 Shutdown Cooling				X								K4.03: Knowledge of SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) design feature(s) and/or interlocks which provide for low reactor water level	3.8 3.8	29
206000 HPCI		X						X				K2.01: Knowledge of the electrical power supplies to the following: System valves A2.01: Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Turbine trips	3.2 3.3 4.0 4.0	30/31
207000 Isolation (Emergency) Condenser														
209001 LPCS				X								K4.08: Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following: Automatic system initiation	3.8 4.0	32
209002 HPCS														
211000 SLC					X							K5.06: Knowledge of the operational implications of the following concepts as they apply to STANDBY LIQUID CONTROL SYSTEM: Tank level measurement	3.0 3.2	33
212000 RPS					X					X		K5.02: Knowledge of the operational implications of specific logic arrangements as they apply to REACTOR PROTECTION SYSTEM A4.14: Ability to manually operate and/or monitor in the control room: Reset system following system actuation	3.3 3.4 3.8 3.8	34/35
215003 IRM						X						K6.04: Knowledge of the effect that a loss or malfunction of the following will have on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM: Detectors	3.0 3.0	36
215004 Source Range Monitor							X					AA1.05: Ability to predict and/or monitor changes in parameters associated with operating the SOURCE RANGE MONITOR (SRM) SYSTEM controls including: SCRAM, rod block, and period alarm trip setpoints	3.6 3.8	37

215005 APRM / LPRM				X											K4.01: Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following: Rod withdrawal blocks	3.7 3.7	38
217000 RCIC						X		X							K6.01: Knowledge of the effect that a loss or malfunction of electrical power will have on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) A2.03: Ability to (a) predict the impacts of valve closures on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations	3.4 3.5 3.4 3.3	39/40
218000 ADS				X						X					K4.04: Knowledge of AUTOMATIC DEPRESSURIZATION SYSTEM design feature(s) and/or interlocks which provide for the following: Insures adequate air supply to ADS valves: Plant-Specific A3.09: Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: Reactor vessel water level	3.5 3.6 4.2 4.3	41/42
223002 PCIS/Nuclear Steam Supply Shutoff									X						A2.09: Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System initiation	3.6 3.9	43
239002 SRVs										X					A3.08: Ability to monitor automatic operations of the RELIEF/SAFETY VALVES including: Lights and alarms	3.6 3.6	44
259002 Reactor Water Level Control												X			G2.1.28: Reactor Water Level Control: Knowledge of the purpose and function of major system components and controls	4.1 4.1	45
261000 SGTS						X									K6.05: Knowledge of the effect that a loss or malfunction of the following will have on the STANDBY GAS TREATMENT SYSTEM: Reactor protection system: Plant-Specific	3.1 3.2	46
262001 AC Electrical Distribution	X														K1.01: Knowledge of the physical connections and/or cause effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: Emergency generators	3.8 4.3	47
262002 UPS (AC/DC)				X											K4.01: Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and/or interlocks which provide for the following: Transfer from preferred power to alternate power supplies	3.1 3.4	48
263000 DC Electrical Distribution			X												K3.03: Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION will have on systems with D.C. components	3.4 3.8	49

264000 EDGs	X											X	K1.04: Knowledge of the physical connections and/or cause-effect relationships between EMERGENCY GENERATORS (DIESEL/JET) and the following: Emergency generator cooling water system G2.1.30: Ability to locate and operate components, including local controls, as they apply to Emergency Generators (Diesel/Jet).	3.2 3.3 4.4 4.0	50/51
300000 Instrument Air					X								K5.01: Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: Air compressors	2.5 2.5	52
400000 Component Cooling Water											X		A3.01: Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3.0 3.0	53
K/A Category Point Totals:	2	1	1	5	3	3	2	3	3	1	2	Group Point Total:			26/5

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Category	K/A #	Topic	RO	
			IR	#
1. Conduct of Operations	2.1.29	Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.	4.1/4.0	66
	2.1.1	Knowledge of conduct of operations requirements.	3.8/4.2	67
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9/4.2	68
	Subtotal			3
2. Equipment Control	2.2.39	Knowledge of less than or equal to one hour Technical Specification action statements for systems.	3.9/4.5	69
	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	4.5/4.4	70
	Subtotal			2
3. Radiation Control	2.3.11	Ability to control radiation releases	3.8/4.3	71
	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2/3.7	72
	Subtotal			2
4. Emergency Procedures / Plan	2.4.8	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8/4.5	73
	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.5/4.7	74
	2.4.34	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.2/4.1	75
	Subtotal			3
Tier 3 Point Total				10

Facility:													Date of Exam:					
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											20	4		3	7		
	2											7	2		1	3		
	Tier Totals											27	6		4	10		
2. Plant Systems	1											26	2		3	5		
	2											12	0	1	2	3		
	Tier Totals											38	3		5	8		
3. Generic Knowledge and Abilities Categories						1	2	3	4	10			1	2	3	4	7	
													2	2	1	2		
<p>Note:</p> <ol style="list-style-type: none"> Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two). 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. 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/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements. 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. 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. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories. * The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As. 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; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams. 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 Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)							Form ES-401-1	
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										
295003 Partial or Complete Loss of AC / 6										
295004 Partial or Total Loss of DC Pwr / 6					X		AA2.03: Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Battery voltage	2.9	76	
295005 Main Turbine Generator Trip / 3										
295006 SCRAM / 1					X		AA2.03: Ability to determine and/or interpret the following as they apply to SCRAM: Reactor water level	4.2	77	
295016 Control Room Abandonment / 7										
295018 Partial or Total Loss of CCW / 8										
295019 Partial or Total Loss of Inst. Air / 8					X		AA2.02: Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Status of safety-related instrument air system loads.	3.7	78	
295021 Loss of Shutdown Cooling / 4										
295023 Refueling Acc / 8										
295024 High Drywell Pressure / 5						X	G2.4.18: Knowledge of specific bases for EOPs as they apply to High Drywell Pressure.	4.0	80	
295025 High Reactor Pressure / 3										
295026 Suppression Pool High Water Temp. / 5										
295027 High Containment Temperature / 5										
295028 High Drywell Temperature / 5										
295030 Low Suppression Pool Wtr Lvl / 5										
295031 Reactor Low Water Level / 2					X		EA2.04: Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Adequate Core Cooling	4.8	81	
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1						X	G2.4.6: Knowledge of EOP mitigation strategies as they apply to SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown.	4.7	82	
295038 High Off-site Release Rate / 9						X	G2.4.31: Knowledge of annunciator alarms, indications, or response procedures. (High Off-site Release Rate)	4.1	79	
600000 Plant Fire On Site / 8										
700000 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:					4	3	Group Point Total:		20/7	

ES-401

BWR Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)

Form ES-401-1

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									
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2									
295009 Low Reactor Water Level / 2									
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5					X		A2.01: Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE: Suppression Pool Temperature.	4.0	83
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1						X	G.2.4.41: Knowledge of the emergency action level thresholds and classifications.	3.6	84
295017 High Off-site Release Rate / 9					X		AA2.01: Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE: Off-site release rate: Plant-Specific.	4.2	85
295020 Inadvertent Cont. Isolation / 5 & 7									
295022 Loss of CRD Pumps / 1									
295029 High Suppression Pool Wtr Lvl / 5									
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9									
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals:					2	1	Group Point Total:		7/3

400000 Component Cooling Water																		
K/A Category Point Totals:									2				3	Group Point Total:				26/5

[illegible]

[illegible]

SRO OUTLINE

ES-401-3

Category	K/A #	Topic	SRO	
			IR	#
1. Conduct of Operations	2.1.35	Knowledge of the fuel-handling responsibilities of SROs.	3.9	94
	2.1.32	Ability to explain and apply system limits and precautions.	4.0	95
	Subtotal			2
2. Equipment Control	2.2.17	Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.	3.8	96
	2.2.5	Knowledge of the process for making changes in the facility as described in the safety analysis report.	3.2	97
	Subtotal			2
3. Radiation Control	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal or emergency conditions or activities.	3.8	98
	Subtotal			1
4. Emergency Procedures / Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.	4.4	99
	2.4.30	Knowledge of the emergency plan.	4.0	100
	Subtotal			2
Tier 3 Point Total				7

Tier / Group	Randomly Selected K/A	Reason for Rejection
T1/G2 (Q26)	295029 EK3.02 *	After the Q was written and determined to be acceptable by the Chief Examiner (CE), the decision was made, with CE concurrence, to retain system being tested but revise K/A topic to better reflect Q content while meeting sample plan requirement. Changed K/A topic to EK2.01
T2/G1 (Q35)	212000 A4.04 *	After the Q was written and determined to be acceptable by the Chief Examiner (CE), the decision was made, with CE concurrence, to retain system being tested but revise K/A topic to better reflect Q content while meeting sample plan requirement. Changed K/A topic to EA4.14
T2/G1 (Q41)	218000 K3.02 *	After the Q was written and determined to be acceptable by the Chief Examiner (CE), the decision was made, with CE concurrence, to retain system being tested but revise K/A topic to better reflect Q content while meeting sample plan requirement. Changed K/A topic to EK4.04
T2/G2 (Q59)	219000 K2.02 *	After the Q was written and determined to be acceptable by the Chief Examiner (CE), the decision was made, with CE concurrence, to retain system being tested but revise K/A topic to better reflect Q content while meeting sample plan requirement. Changed K/A topic to EK6.01
Generic (Q72)	G 2.3.7	Changed to G 2.3.12 due to CE determined the original Q to be GET level and randomly selected new K/A.
T1/G2 (Q85)	295017 AA2.05 *	After the Q was written and determined to be acceptable by the Chief Examiner (CE), the decision was made, with CE concurrence, to retain system being tested but revise K/A topic to better reflect Q content while meeting sample plan requirement. Changed K/A topic to AA2.01

* The original Q concept was retained.

Facility: Limerick	Date of Examination: 10/9/12-10/12/12
Examination Level: RO	Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations A-1.1	R, N	Evaluate Overtime Work Request
Conduct of Operations A-1.2	R, N	Review Drywell Floor Drain Sump/Equipment Drain Tank Logs and Determine Compliance with TS 3.4.3.2
Equipment Control A-2	R, N	Determine Blocking Required per OP-MA-109-101 "Clearance and Tagging"
Radiation Control A-3	N/A	N/A
Emergency Procedures/Plan A-4	R, N	Emergency Plan Communications

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

* Type Codes & Criteria:

- (C)ontrol room, (S)imulator, or Class(R)oom
- (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
- (N)ew or (M)odified from bank (≥ 1)
- (P)revious 2 exams (≤ 1 ; randomly selected)

Facility: Limerick

Date of Examination: 10/9/12-10/12/12

Examination Level: **SRO**

Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations A-1.1	R, N	Evaluation of Overtime Hours to Determine Availability
Conduct of Operations A-1.2	R, N	Review Drywell Floor Drain Sump/Equipment Drain Tank Logs and Determine Compliance with TS 3.4.3.2
Equipment Control A-2	R, N	Review and Verify Blocking Required per OP-MA-109- 101 "Clearance and Tagging"
Radiation Control A-3	R, N	Review and Approve Inventory Release from Equipment Drain Sample Tank to Cooling Tower Blowdown Line
Emergency Procedures/Plan A-4	R, N	Classify an SAE with Escalation to a GE and Make Protective Action Recommendations
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected)		

Facility: <u>Limerick</u>		Date of Examination: <u>10/9/12</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>1</u>
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Start Reactor Recirculation Pump / 202001	A, N, S	1
*b. HPCI Manual Start / 206000	A, EN, N, S	2
**c. Perform Turbine Bypass Valve Testing IAW ST-6-001-761-1 / 241000	D, S	3
d. SDC Restoration / 223002	A, L, N, S	4
**e. Synchronize and Load D12 Diesel Generator to 1000 KW / 264000	A, E, N	6
f. Scram Channel A1 and A2 Functional Test / 212000	A, M, S	7
g. Restore RECW, DWCW, and Instrument Gas / 400000	D, S	8
*h. Standby Gas Treatment Manual Startup with Charcoal Enclosure Hi Temp / 261000	A, M, S	9
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Maximize CRD Flow After Shutdown During Emergency Conditions (T-240) Unit 2 / 295031	E, L, N, R	1
j. Alignment of Equipment for Manual Operation of LPCI / 203000	A, N, R	2
k. Venting Primary Containment Using the 24" Suppression Pool Purge Supply / 295010 223001	E, N	5
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	<p style="text-align: center;">4-6 / 4-6 / 2-3</p> <p style="text-align: center;">≤ 9 / ≤ 8 / ≤ 4</p> <p style="text-align: center;">≥ 1 / ≥ 1 / ≥ 1</p> <p style="text-align: center;">- / - / ≥ 1 (control room system)</p> <p style="text-align: center;">≥ 1 / ≥ 1 / ≥ 1</p> <p style="text-align: center;">≥ 2 / ≥ 2 / ≥ 1</p> <p style="text-align: center;">≤ 3 / ≤ 3 / ≤ 2 (randomly selected)</p> <p style="text-align: center;">≥ 1 / ≥ 1 / ≥ 1</p>	

* JPM B & H are paired to run simultaneously.

** JPM C & E are paired with a stagger start. JPM E will be followed by JPM C.

Facility: <u>Limerick</u>		Date of Examination: <u>10/9/12</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: <u>1</u>

Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Start Reactor Recirculation Pump / 202001	A, N, S	1
*b. HPCI Manual Start / 206000	A, EN, N, S	2
**c. Perform Turbine Bypass Valve Testing IAW ST-6-001-761-1 / 241000	D, S	3
d. SDC Restoration / 223002	A, L, N, S	4
**e. Synchronize and Load D12 Diesel Generator to 1000 KW / 264000	A, E, N	6
f. Scram Channel A1 and A2 Functional Test / 212000	A, M, S	7
*h. Standby Gas Treatment Manual Startup with Charcoal Enclosure Hi Temp / 261000	A, M, S	9

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Maximize CRD Flow After Shutdown During Emergency Conditions (T-240) Unit 2 / 295031	E, L, N, R	1
j. Alignment of Equipment for Manual Operation of LPCI / 203000	A, N, R	2
k. Venting Primary Containment Using the 24" Suppression Pool Purge Supply / 295010 223001	E, N	5

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

* JPM B & H are paired to run simultaneously.

** JPM C & E are paired with a stagger start. JPM E will be followed by JPM C.

Facility: <u>Limerick</u>	Date of Examination: <u>10/9/12</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>	Operating Test No.: <u>1</u>

Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
*b. HPCI Manual Start / 206000	A, EN, N, S	2
d. SDC Restoration / 223002	A, L, N, S	4
**e. Synchronize and Load D12 Diesel Generator to 1000 KW / 264000	A, E, N	6

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Maximize CRD Flow After Shutdown During Emergency Conditions (T-240) Unit 2 / 295031	E, L, N, R	1
k. Venting Primary Containment Using the 24" Suppression Pool Purge Supply / 295010 223001	E, N	5

[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

* JPM B & H are paired to run simultaneously.

** JPM C & E are paired with a stagger start. JPM E will be followed by JPM C.

Facility: Limerick

Scenario No.: 1

Op-Test No.: _____

Examiners: _____

_____Operators: _____

Initial Conditions: Unit 1 at 95% power to recover HCU maintenance rods, D11 EDG out of service for overhaul, day 2 of 30 day LCO

Turnover: Recover the HCU maintenance rods and return Unit 1 to 100% power

Event No.	Malf. No.	Event Type*	Event Description
1		R-ATC	Recover HCU maintenance rods
2	MPR011B	I-ATC, TS-SRO	1B RBM Fails Inop
3	MMC077B	C-BOP	Hotwell level controller failure
4	MED015D, MGD422B, MED012	C-BOP, C-ATC	Closure failure of 101-D12/Temporary loss of D124-G-D Load Center/Temporary loss of ability to drive control rods
5	MSL001A, MCU195A	C-ATC, TS-SRO	SLC spurious injection with RWCU isolation failure
6	MRP029C, MRP407C, MSL559	M-ALL	Electric ATWS/RRCS failure/SLC header rupture
7	MEH110, MEH108	C-ATC, C-BOP	T-221 failure, main turbine trip, bypass valve closure
8	MRSW600A/C	C-BOP	RHRSW Pump Trip in Suppression Pool Cooling
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Limerick	Scenario No.: <u>2</u>	Op-Test No.: _____	
Examiners: _____ _____	Operators: _____ _____		
<p>Initial Conditions: 100% power following a rod pattern adjustment, MOL, D11 Diesel out of service to repair a Jacket Water System leak (48 hours into a 30 day LCO - 3.8.1, AC Sources Operating); repairs expected to be completed within the next 24 hours</p> <p>Turnover: Maintain 100% power</p>			
Event No.	Malfunction No.	Event Type*	Event Description
1	MFW005B	I-ATC TS-SRO	LEFM Spool 'B' Enters Maintenance Mode
2	MHP450	C-BOP	HPCI Spurious Start
3	MFH564B	R-ATC	FWH 12B Level Sensing Line Fails High (Reduce Power \leq 85%)
4	MRR201A MRR209A1 MRR209A2	C-ATC TS-SRO	'1A' Recirc ASD Loss of Cooling with a Failure of the '1A' ASD 13.2 KV Breaker to Trip / Results in Single Loop Operation in Restricted Region of Power/Flow Map
5	MED282B	C-BOP TS-SRO	Loss of 125/250 VDC Safeguard Bus 1BD105
6	MED261	M-All	Grid Instability Resulting in Loss of Offsite Power
7	MDG420C	C-BOP	D13 Diesel Auto Start Failure (Recoverable)
8	MRR440A MDG418D MRC466	M-All	Small Break LOCA (0.5% to 1% ramp over 5 minutes) with D14 Diesel Trip on Bus Lockout / RCIC Trip on Overspeed (Recoverable after RPV Level reaches -161")
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

Scenario Summary and Administration Instructions

Appendix D

Scenario Outline

Form ES-D-1

Facility: Limerick	Scenario No.: <u>4</u>	Op-Test No.: _____
Examiners: _____ _____	Operators: _____ _____	
Initial Conditions: 100% power		
Turnover: The PJM has issued a Maximum Emergency Generation Alert due to grid instabilities. Maintain reactor power at 100% and comply with TSO requests for grid support as necessary.		

Event No.	Malf. No.	Event Type*	Event Description
1	MVI232F MRP029A	I-ATC TS-SRO	Rx Level Transmitter LT-42-1N080C Fails Low with No RPS Actuation Signal
2	VIC105A6	R-ATC TS-SRO	'1A' Recirc Pump Motor High Vibration (Power Reduced to $\leq 93\%$ to Clear Annunciator 111 D2)
3	MCU194	C-BOP	RWCU Leak with Auto Isolation Failure (Manual Isolation Successful)
4	MEG095	C-BOP	Main Generator Auto AC Voltage Regulator Failure Resulting in Transfer to the Manual DC Voltage Regulator
5		C-ATC	'1A' Recirc Pump ASD Controller Incremental Speed Increase
6	MED275C	C-BOP TS-SRO	Loss of Safeguard Bus D134 (Loss of Reactor Enclosure Supply, Exhaust, and REECE Fans)
7	MRT001B MMS061A MMS062A MMS136	M-ALL	Main Steam Line High High Radiation (Fuel Failure) / MSL Break in Outboard MSIV Room (Rooms 407 and 518) with Failure of the 'A' Main Steam Line to Isolate
8	MRE001A MRE001B MRE317 RRE013	C-ATC	SGTS Exhaust Fans 0AV163 and 0BV163 Trip (Recoverable) / Leak Propagation

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