

Facility: Vermont Yankee		Date of Exam: January 31, 2005																
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	5	5	N/A			2	1	N/A			4	20	4	3	7	
	2	1	1	3	N/A			1	1	N/A			0	7	1	2	3	
	Tier Totals	4	6	8	N/A			3	2	N/A			4	27	5	5	10	
2. Plant Systems	1	6	2	2	0	4	1	1	4	2	2	2	26	3	2	5		
	2	0	0	2	3	1	1	1	1	2	1	0	12	2	1	3		
	Tier Totals	6	2	4	3	5	2	2	5	4	3	2	38	5	3	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 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 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/S 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 (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. Use duplicate pages for RO and SRO-only exams.
 9. For Tier 3, select topics form 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

X = selected for RO section
 S = selected for SRO section

Rev 1: Changed numbering so the last 25 questions will be SRO only, corrected tier 2 K&A counts, re-sampled 2 K&As (see Rev 1 of K&A rejection sheet), changed 295013 to an RO question and 295035 to SRO question.

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		X					Knowledge of the interrelations between Partial or Complete Loss of Forced Core Flow Circulation and the following: (CFR: 41.7 / 45.8) AK2.04 Reactor/turbine pressure regulating system: Plant-Specific 3.30 3.30	3.30	1
						X	2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual (CFR 45.3) 3.30 3.30	3.30	2
295003 Partial or Complete Loss of AC / 6				X			Ability to operate and / or monitor the following as they apply to Partial or Complete Loss of AC (CFR: 41.7 / 45.6) AA1.01 A.C. electrical distribution system 3.70 3.80	3.70	3
295004 Partial or Total Loss of DC Power / 6			X				Knowledge of the reasons for the following responses as they apply to Partial or Total Loss of DC Power: (CFR: 41.5 / 45.6) AK3.01 Load shedding: Plant-Specific 2.60 3.10	2.60	4
295005 Main Turbine Generator Trip / 3		X					Knowledge of the interrelations between Main Turbine Generator Trip and the following: (CFR: 41.7 / 45.8) AK2.08 A.C. electrical distribution 3.20 3.30	3.20	5
295006 SCRAM / 1			X				Knowledge of the reasons for the following responses as they apply to SCRAM): (CFR: 41.5 / 45.6) AK3.01 Reactor water level response 3.80 3.90	3.80	6
295016 Control Room Abandonment / 7				X			Ability to operate and / or monitor the following as they apply to Control Room Abandonment: (CFR: 41.7 / 45.6) AA1.05 D.C. electrical distribution 2.80 2.90	2.80	7
295018 Partial or Total Loss of CCW / 8	X						Knowledge of the operational applications of the following concepts as they apply to the Partial or Total Loss of CCW: (CFR: 41.8 to 41.10) AK1.01 Effects on component/system operations 3.50 3.60	3.50	8
						S	Ability to determine and interpret the following as they apply to Partial or Total Loss of CCW: (CFR: 41.10 / 43.5 / 45.13) AA2.03 Cause for partial or complete loss 3.20 3.50	3.50	76

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295019 Partial or Total Loss of Inst. Air / 8						X	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls (CFR 41.10, 43.2, 45.6) 4.00 4.00	4.00	9
						S	2.1.32 Ability to explain and apply system limits and precautions (CFR 41.10, 43.2, 45.12) 3.40 3.80	3.80	77
295021 Loss of Shutdown Cooling / 4		X					Knowledge of the interrelations between Loss of Shutdown Cooling and the following: (CFR: 41.7 / 45.8) AK2.02 Reactor water cleanup 3.20 3.30	3.20	10
						S	Ability to determine and interpret the following as they apply to Loss of Shutdown Cooling: (CFR: 41.10 / 43.5 / 45.13) AA2.06 Reactor pressure 3.20 3.30	3.30	78
295023 Refueling Acc Cooling Mode / 8						X	Ability to determine and interpret the following as they apply to Refueling Acc Cooling Mode: (CFR: 41.10 / 43.5 / 45.13) AA2.04 Occurrence of fuel handling accident 3.40 4.10	3.40	11
295024 High Drywell Pressure / 5			X				Knowledge of the reasons for the following responses as they apply to High Drywell Pressure: (CFR: 41.5 / 45.6) EK3.08 Containment spray: Plant-specific 3.70 4.10	3.70	12
295025 High Reactor Pressure / 3		X					Knowledge of the interrelations between High Reactor Pressure and the following: (CFR: 41.7 / 45.8) EK2.06 HPCI: Plant-specific 3.80 3.80	3.80	13
						S	Ability to determine and interpret the following as they apply to High Reactor Pressure: (CFR: 41.10 / 43.5 / 45.13) EA2.01 Reactor pressure 4.30 4.30	4.30	79
295026 Suppression Pool High Water Temp. / 5	X						Knowledge of the operational applications of the following concepts as they apply to the Suppression Pool High Water Temp: (CFR: 41.8 to 41.10) EK1.01 Pump NPSH 3.00 3.40	3.00	14
						S	2.4.33 Knowledge of the process used to track inoperable alarms (CFR 41.10, 43.5, 45.13) 2.40 2.80	2.80	80
295027 High Containment Temperature / 5							Suppressed, no Mark III containment at VY		

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295032 High Secondary Containment Area Temperature / 5			X				Knowledge of the reasons for the following responses as they apply to High Secondary Containment Area Temperature: (CFR: 41.5 / 45.6) EK3.01 Emergency/normal depressurization 3.50 3.80	3.50	26
295033 High Secondary Containment Area Radiation Levels / 9									
295034 Secondary Containment Ventilation High Radiation / 9	X						Knowledge of the operational applications of the following concepts as they apply to the Secondary Containment Ventilation High Radiation: (CFR: 41.8 to 41.10) EK1.02 Radiation releases 4.10 4.40	4.10	27
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5					S		Ability to determine and interpret the following as they apply to Secondary Containment High Sump/Area Water Level: (CFR: 41.10 / 43.5 / 45.13) EA2.02 Water level in the affected area 3.10 3.10	3.10	85
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals							Group Point Total:		7/3

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	2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations (CFR 43.5, 45.12) 3.00 4.00	3.00	28
205000 Shutdown Cooling											X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm (CFR 43.5, 45.3, 45.12) 3.30 3.60	3.30	29
206000 HPCI								X				Ability to (a) predict the impacts of the following on the HPCI and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.15 Loss of control oil pressure: BWR-2, 3, 4 3.40 3.50	3.40	30
											S	2.4.06 Knowledge symptom based EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13) 3.1 4.0	4.0	86
207000 Isolation (Emergency) Condenser												Suppressed, system does not exist at VY		
209001 LPCS		X										LPCS Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.02 Valve power 2.50 2.70	2.50	31
209002 HPCS												Suppressed, system does not exist at VY		
211000 SLC	X											Knowledge of the physical connections and/or cause-effect relationships between SLC and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.07 Jet pump differential pressure indication: Plant-Specific 2.60 2.60	2.60	32
											S	2.4.07 Knowledge of event based EOP mitigation strategies (CFR 41.10, 43.5, 45.13) 3.10 3.80	3.80	87
212000 RPS										X		RPS Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.12 Close/open SCRAM instrument volume vent and/or drain valves 3.90 3.90	3.90	33

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	#
215003 IRM	X											Knowledge of the physical connections and/or cause-effect relationships between IRM and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.02 Reactor manual control 3.60 3.60	3.60	34
215004 Source Range Monitor	X											Knowledge of the physical connections and/or cause-effect relationships between Source Range Monitor and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.06 Reactor vessel 2.80 2.80	2.80	35
215005 APRM / LPRM			X									Knowledge of the effect that a loss or malfunction of the APRM / LPRM will have on the following: (CFR: 41.7 / 45.4) K3.06 IRM: Plant-Specific 3.50 3.60	3.50	36
								S				Ability to (a) predict the impacts of the following on the APRM / LPRM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.06 Recirculation flow channels upscale 3.40 3.50	3.40	88
217000 RCIC					X							Knowledge of the operational implications of the following concepts as they apply to the RCIC: (CFR: 41.5 / 45.3) K5.01 Indications of pump cavitation 2.60 2.60	2.60	37
									X			Ability to monitor automatic operations of the (SYSTEM) including: (CFR: 41.7 / 45.7) A3.03 System pressure 3.70 3.60	3.70	38
218000 ADS								X				Ability to (a) predict the impacts of the following on the ADS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.03 Loss of air supply to ADS valves: Plant-Specific 3.40 3.60	3.40	39
					X							Knowledge of the operational implications of the following concepts as they apply to the ADS: (CFR: 41.5 / 45.3) K5.01 ADS logic operation 3.80 3.80	3.80	40

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	#
223002 PCIS/Nuclear Steam Supply Shutoff								X				Ability to (a) predict the impacts of the following on the PCIS/Nuclear Steam Supply Shutoff and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.07 Various process instrumentation failures 2.70 2.90	2.70	41
						X						Knowledge of the effect that a loss or malfunction of the following will have on the PCIS/Nuclear Steam Supply Shutoff: (CFR: 41.7 / 45.7) K6.02 D.C. electrical distribution 3.00 3.20	3.00	42
239002 SRVs								S				Ability to (a) predict the impacts of the following on the SRVs and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.01 Stuck open vacuum breakers 3.00 3.30	3.30	89
										X		SRVs Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.06 Reactor water level 3.90 4.10	3.90	43
259002 Reactor Water Level Control								X				Ability to (a) predict the impacts of the following on the Reactor Water Level Control and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.01 Loss of any number of main steam flow inputs 3.30 3.40	3.30	44
261000 SGTS									X			Ability to monitor automatic operations of the SGTS including: (CFR: 41.7 / 45.7) A3.03 Valve operation 3.00 2.90	3.00	45
262001 AC Electrical Distribution	X											Knowledge of the physical connections and/or cause-effect relationships between AC Electrical Distribution and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.04 Uninterruptible power supply 3.10 3.40	3.10	46

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	#
262002 UPS (AC/DC)							X					Ability to predict and/or monitor changes in parameters associated with operating the UPS (AC/DC) controls including: (CFR: 41.5 / 45.5) A1.02 Motor generator outputs 2.50 2.90	2.50	47
	X											Knowledge of the physical connections and/or cause-effect relationships between UPS (AC/DC) and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.06 Unit computer: Plant-Specific 2.60 2.70	2.60	48
263000 DC Electrical Distribution		X										DC Electrical Distribution Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.01 Major D.C. loads 3.10 3.40	3.10	49
					X							Knowledge of the operational implications of the following concepts as they apply to the DC Electrical Distribution: (CFR: 41.5 / 45.3) K5.01 Hydrogen generation during battery charging 2.60 2.90	2.60	50
264000 EDGs								S				Ability to (a) predict the impacts of the following on the EDGs and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.10 LOCA 3.90 4.20	4.20	90
					X							Knowledge of the operational implications of the following concepts as they apply to the EDGs: (CFR: 41.5 / 45.3) K5.06 Load sequencing 3.40 3.50	3.40	51
300000 Instrument Air	X											Knowledge of the physical connections and/or cause-effect relationships between Instrument Air and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.05 Main Steam Isolation valve air 3.10 3.20	3.10	52
400000 Component Cooling Water			X									Knowledge of the effect that a loss or malfunction of the Component Cooling Water will have on the following: (CFR: 41.7 / 45.4) K3.01 Loads cooled by CCWS 2.90 3.30	2.90	53
K/A Category Point Totals												Group Point Total:		26/5

ES-401

BWR Examination Outline
Plant Systems – Tier 2/Group 2 (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	#
201001 CRD Hydraulic														
201002 RMCS								S				Ability to (a) predict the impacts of the following on the RMCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.03 Select block 2.90 2.80	2.80	91
201003 Control Rod and Drive Mechanism								X				Ability to (a) predict the impacts of the following on the Control Rod and Drive Mechanism and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.05 Reactor Scram 4.10 4.10	4.10	54
201004 RSCS												Suppressed, system does not exist at VY		
201005 RCIS												Suppressed, system does not exist at VY		
201006 RWM														
202001 Recirculation										X		Recirculation Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.12 Core flow 3.90 3.80	3.80	55
202002 Recirculation Flow Control														
204000 RWCU									X			Ability to monitor automatic operations of the RWCU including: (CFR: 41.7 / 45.7) A3.01 System pressure downstream of the pressure regulating valve: LP-RWCU 3.30 3.30	3.30	56
214000 RPIS														
215001 Traversing In-core Probe								S				Ability to (a) predict the impacts of the following on the Traversing In-core Probe and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.07 Failure to retract during accident conditions: Mark-I&II (Not-BWR1) 3.40 3.70	3.70	92
215002 RBM														

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	#
245000 Main Turbine Gen. / Aux.			X									Knowledge of the effect that a loss or malfunction of the Main Turbine Gen. / Aux. will have on the following: (CFR: 41.7 / 45.4) K3.07 Reactor protection system 3.60 3.70	3.60	63
256000 Reactor Condensate														
259001 Reactor Feedwater														
268000 Radwaste														
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection				X								Knowledge of Fire Protection design feature(s) and or interlock(s) which provide for the following: (CFR: 41.7) K4.06 Fire suppression capability that does not rely on the displacement of oxygen (Halon): Plant-Specific 3.40 3.40	3.40	64
288000 Plant Ventilation														
290001 Secondary CTMT														
290003 Control Room HVAC														
290002 Reactor Vessel Internals				X								Knowledge of Reactor Vessel Internals design feature(s) and or interlock(s) which provide for the following: (CFR: 41.7) K4.05 Natural circulation 3.30 3.50	3.30	65
K/A Category Point Totals												Group Point Total:		12/3

ES-401

Generic Knowledge and Abilities Outline (Tier 3)

Form ES-401-3

Facility:

Date of Exam

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.					
	2.1.8	Ability to coordinate personnel activities outside the control room (CFR 45.5, 45.12, 45.13)	3.8	66		
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status (CFR 45.12)	3.0	67		
	2.1.32	Ability to explain and apply system limits and precautions (CFR 41.10, 43.2, 45.12)	3.4	68		
	2.1.13	Knowledge of facility requirements for controlling vital / controlled access (CFR 41.10, 43.5, 45.9, 45.10)			2.9	94
	2.1.4	Knowledge of shift staffing requirements (CFR 41.10, 43.2)			3.4	95
	Subtotal					
2. Equipment Control	2.2.13	Knowledge of tagging and clearance procedures (CFR 41.10, 45.13)	3.6	69		
	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation (CFR 45.12)	3.5	70		
	2.2.					
	2.2.					
	2.2.7	Knowledge of the process for conducting tests for experiments not described in the safety analysis report (CFR 43.3, 45.13)			3.2	96
	2.2.20	Knowledge of the process for managing troubleshooting activities (CFR 43.5, 45.13)			3.3	97
	Subtotal					

Facility:

Date of Exam

Category	K/A #	Topic	RO		SRO-Only	
3. Radiation Control	2.3.11	Ability to control radiation releases (CFR 45.9, 45.10) 2.70 3.20	2.7	71		
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements (CFR 41.12, 43.4, 45.9, 45.10) 2.60 3.00	2.6	72		
	2.3					
	2.3					
	2.3					
	2.3.2	Knowledge of facility ALARA program (CFR 41.12, 43.4, 45.9, 45.10) 2.50 2.90			2.9	98
	Subtotal					
4. Emergency Procedures / Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps (CFR 41.10, 43.5, 45.13) 4.30 4.60	4.3	73		
	2.4.17	Knowledge of EOP terms and definitions (CFR 41.10, 45.13) 3.10 3.80	3.1	74		
	2.4.29	Knowledge of the emergency plan (CFR 43.5, 45.11) 2.60 4.00	2.6	75		
	2.4.					
	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions (CFR 41.10, 43.5, 45.13) 2.90 3.60				99
	2.4.32	Knowledge of operator response to loss of all annunciators (CFR 41.10, 43.5, 45.13) 3.30 3.50			3.5	100
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
3/4	2.4.18	Not referenced to 10CRF55.43 for SRO
3/2	2.2.5	< 2.5 IR for RO
3/4	2.4.42	< 2.5 IR for RO
3/3	2.3.5	< 2.5 IR for RO
3/2	2.2.20	< 2.5 IR for RO
3/2	2.2.19	< 2.5 IR for RO
3/2	2.2.31	< 2.5 IR for RO
1/1	295024 EK3.03	No Mark III containment
1/1	295021 AK2.06	No head spray system
2/1	211000 K1.10	No connection or cause effect relationship between SLC and HPCI
2/1	215005 K3.04	No RCIS system
2/2	245000 K2	< 2.5 IR for RO for all K2 K&As
2/1	264000 K5.03	< 2.5 IR for RO
2/1	262002 K1.01	No relationship between UPS and feedwater level control
2/1	262002 K1.09	No relationship between UPS and drywell ventilation control
2/1	262002 K1.13	No relationship between UPS and recirculation pump speed control
2/1	262002 K1.14	No relationship between UPS and main steam line radiation monitors
2/1	262002 K1.15	No relationship between UPS and stack gas monitors
2/1	262002 K1.16	No relationship between UPS and MSIVs
2/1	262002 K1.17	No relationship between UPS and scram solenoid valves
2/1	262002 K1.20	No relationship between UPS and plant communications equipment
2/1	262002 A1.01	< 2.5 IR for RO
2/1	300000 K1.01	< 2.5 IR for RO
2/1	264000 2.4.46	System oversampled. Third K&A selected
1/2	295036 A1.02	Random change of K&A to insure RO Tier 1 has 2 "A2" K&As
2/1	205000 A2.12	Random selection and change of K&A for RO Tier 2 to insure 2 "G" K&As
2/1	206000 2.4.46	Oversampled. Verification of alarms tested throughout simulator scenarios.
2/2	223001 A1.01	Oversampled for drywell temperature and ventilation.
		Note: Rev 1 consists of the last 2 rejected K&As.