

Facility: Fermi		Date of Exam: 5/24/2021 – 6/2/2021																	
Tier	Group	RO K/A Category Points											SRO-Only Points						
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total			
1. Emergency and Abnormal Plant Evolutions	1	4	3	4	N/A			3	3	N/A			3	20			7		
	2	1	1	1	N/A			2	1	N/A			1	7			3		
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27			10		
2. Plant Systems	1	1	3	3	2	3	2	2	3	3	2	2	26				5		
	2	1	1	1	2	1	1	1	1	1	1	1	12				3		
	Tier Totals	2	4	4	4	4	3	3	4	4	3	3	38				8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					2		3		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 outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the “Tier Totals” in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it is replaced by a K/A from another Tier 3 category.)
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 outline. Systems or evolutions that do not apply at the facility should be deleted with justification. 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. 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’ 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 a category 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.

G* Generic K/As

- * These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.
- ** These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO)						Form ES-401-1	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
295001 (APE 1) Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	02						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Power/flow distribution. (CFR: 41.8 to 41.10)	3.3	1
295003 (APE 3) Partial or Complete Loss of AC Power / 6				03			AA1.03 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Systems necessary to assure safe plant shutdown. (CFR: 41.7 / 45.6)	4.4	2
295004 (APE 4) Partial or Total Loss of DC Power / 6					02		AA2.02 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Extent of partial or complete loss of D.C. power. (CFR: 41.10 / 43.5 / 45.13)	3.5	3
295005 (APE 5) Main Turbine Generator Trip / 3			01				AK3.01 - Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: Reactor SCRAM. (CFR: 41.5 / 45.6)	3.8	4
295006 (APE 6) Scram / 1				02			AA1.02 - Ability to operate and/or monitor the following as they apply to SCRAM: Reactor water level control system. (CFR: 41.7 / 45.6)	3.9	5
295016 (APE 16) Control Room Abandonment / 7			02				AK3.02 - Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT: Turbine trip. (CFR: 41.5 / 45.6)	3.7	6
295018 (APE 18) Partial or Complete Loss of CCW / 8		01					AK2.01 - Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER and the following: System loads. (CFR: 41.7 / 45.8)	3.3	7
295019 (APE 19) Partial or Complete Loss of Instrument Air / 8			03				AK3.03 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Service air isolations: Plant-Specific. (CFR: 41.5 / 45.6)	3.2	8
295021 (APE 21) Loss of Shutdown Cooling / 4	01						AK1.01 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF SHUTDOWN COOLING: Decay heat. (CFR: 41.8 to 41.10)	3.6	9
295023 (APE 23) Refueling Accidents / 8		03					AK2.03 - Knowledge of the interrelations between REFUELING ACCIDENTS and the following: Radiation monitoring equipment. (CFR: 41.7 / 45.8)	3.4	10
295024 High Drywell Pressure / 5				16			EA1.16 - Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: Containment/drywell vacuum breakers. (CFR: 41.7 / 45.6)	3.4	11
295025 (EPE 2) High Reactor Pressure / 3						04.06	Generic 2.4.6 - Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)	3.7	12

295026 (EPE 3) Suppression Pool High Water Temperature / 5					02		EA2.02 - Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Suppression pool level. (CFR: 41.10 / 43.5 / 45.13)	3.8	13
295027 (EPE 4) High Containment Temperature (Mark III Containment Only) / 5									
295028 (EPE 5) High Drywell Temperature (Mark I and Mark II only) / 5					01		EA2.01 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell temperature. (CFR: 41.10 / 43.5 / 45.13)	4.0	14
295030 (EPE 7) Low Suppression Pool Water Level / 5						04.04	Generic 2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures. (CFR: 41.10 / 43.2 / 45.6)	4.5	15
295031 (EPE 8) Reactor Low Water Level / 2	01						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling. (CFR: 41.8 to 41.10)	4.6	16
295037 (EPE 14) Scram Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	05						EK1.05 - Knowledge of the operational implications of the following concepts as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Cold shutdown boron weight: Plant-Specific. (CFR: 41.8 to 41.10)	3.4	17
295038 (EPE 15) High Offsite Radioactivity Release Rate / 9		04					EK2.04 - Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Stack-gas monitoring system: Plant-Specific. (CFR: 41.7 / 45.8)	3.9	18
600000 (APE 24) Plant Fire On Site / 8						01.30	Generic 2.1.30 - Ability to locate and operate components, including local controls. (CFR: 41.7 / 45.7)	4.4	19
700000 (APE 25) Generator Voltage and Electric Grid Disturbances / 6			02				AK3.02 - Knowledge of the reasons for the following responses as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Actions contained in abnormal operating procedures for voltage and grid disturbances. (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8)	3.6	20
K/A Category Totals:									
	4	3	4	3	3	3	Group Point Total:		20

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO)						Form ES-401-1	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
295002 (APE 2) Loss of Main Condenser Vacuum / 3			09				AK3.09 - Knowledge of the reasons for the following responses as they apply to LOSS OF MAIN CONDENSER VACUUM: Reactor power reduction. (CFR: 41.5 / 45.6)	3.2	21
295007 (APE 7) High Reactor Pressure / 3						02.22	Generic 2.2.22 - Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)	4.0	22
295008 (APE 8) High Reactor Water Level / 2		09					AK2.09 - Knowledge of the interrelations between HIGH REACTOR WATER LEVEL and the following: Reactor water cleanup system (ability to drain); Plant-Specific. (CFR: 41.7 / 45.8)	3.1	23
295009 (APE 9) Low Reactor Water Level / 2									
295010 (APE 10) High Drywell Pressure / 5				05			AA1.05 - Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: Drywell/suppression vent and purge. (CFR: 41.7 / 45.6)	3.1	24
295011 (APE 11) High Containment Temperature (Mark III Containment only) / 5									
295012 (APE 12) High Drywell Temperature / 5									
295013 (APE 13) High Suppression Pool Temperature. / 5									
295014 (APE 14) Inadvertent Reactivity Addition / 1				02			AA1.02 - Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION: Recirculation flow control system. (CFR: 41.7 / 45.6)	3.6	25
295015 (APE 15) Incomplete Scram / 1									
295017 (APE 17) Abnormal Offsite Release Rate / 9									
295020 (APE 20) Inadvertent Containment Isolation / 5 & 7					06		AA2.06 - Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION: Cause of isolation. (CFR: 41.10 / 43.5 / 45.13)	3.4	26
295022 (APE 22) Loss of Control Rod Drive Pumps / 1									
295029 (EPE 6) High Suppression Pool Water Level / 5									
295032 (EPE 9) High Secondary Containment Area Temperature / 5									
295033 (EPE 10) High Secondary Containment Area Radiation Levels / 9									
295034 (EPE 11) Secondary Containment Ventilation High Radiation / 9									
295035 (EPE 12) Secondary Containment High Differential Pressure / 5	01						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Secondary containment integrity. (CFR: 41.8 to 41.10)	3.9	27

295036 (EPE 13) Secondary Containment High Sump/Area Water Level / 5										
500000 (EPE 16) High Containment Hydrogen Concentration / 5										
K/A Category Point Totals:	1	1	1	2	1	1	Group Point Total:			7

ES-401	BWR Examination Outline Plant Systems—Tier 2/Group 1 (RO)											Form ES-401-1		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
203000 (SF2, SF4 RHR/LPCI) RHR/LPCI: Injection Mode					02							K5.02 - Knowledge of the operational implications of the following concepts as they apply to RHR/LPCI: INJECTION MODE (PLANT SPECIFIC): Core cooling methods. (CFR: 41.5 / 45.3)	3.5	28
205000 (SF4 SCS) Shutdown Cooling										04		A4.04 - Ability to manually operate and/or monitor in the control room: Heat exchanger cooling water valves. (CFR: 41.7 / 45.5 to 45.8)	3.4	29
												01.23 - Generic 2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)	4.3	30
206000 (SF2, SF4 HPCIS) High-Pressure Coolant Injection								08				A2.08 - 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: High suppression pool temperature: BWR-2,3,4. (CFR: 41.5 / 45.6)	3.9	31
												04.46 - Generic 2.4.46 - Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)	4.2	32
207000 (SF4 IC) Isolation (Emergency) Condenser														
209001 (SF2, SF4 LPCS) Low-Pressure Core Spray			03									K3.03 - Knowledge of the effect that a loss or malfunction of the LOW PRESSURE CORE SPRAY SYSTEM will have on following: Emergency generators. (CFR: 41.7 / 45.4)	2.9	33
209002 (SF2, SF4 HPCS) High-Pressure Core Spray														
211000 (SF1 SLCS) Standby Liquid Control	06											K1.06 - Knowledge of the physical connections and/or cause-effect relationships between STANDBY LIQUID CONTROL SYSTEM and the following: Reactor vessel. (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.7	34
212000 (SF7 RPS) Reactor Protection		01										K2.01 - Knowledge of electrical power supplies to the following: RPS motor-generator sets. (CFR: 41.7)	3.2	35
215003 (SF7 IRM) Intermediate-Range Monitor								06				A2.06 - Ability to (a) predict the impacts of the following on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Faulty range switch. (CFR: 41.5 / 45.6)	3.0	36
215004 (SF7 SRMS) Source-Range Monitor					03							K5.03 - Knowledge of the operational implications of the following concepts as they apply to SOURCE RANGE MONITOR (SRM) SYSTEM: Changing detector position. (CFR: 41.5 / 45.3)	2.8	37

215005 (SF7 PRMS) Average Power Range Monitor/Local Power Range Monitor	02										K2.02 - Knowledge of electrical power supplies to the following: APRM channels. (CFR: 41.7)	2.6	38
217000 (SF2, SF4 RCIC) Reactor Core Isolation Cooling						05					A1.05 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) controls including: RCIC turbine speed. (CFR: 41.5 / 45.5)	3.7	39
218000 (SF3 ADS) Automatic Depressurization		02									K3.02 - Knowledge of the effect that a loss or malfunction of the AUTOMATIC DEPRESSURIZATION SYSTEM will have on following: Ability to rapidly depressurize the reactor. (CFR: 41.7 / 45.4)	4.5	40
223002 (SF5 PCIS) Primary Containment Isolation/Nuclear Steam Supply Shutoff								01			A3.01 - Ability to monitor automatic operations of the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF including: System indicating lights and alarms. (CFR: 41.7 / 45.7)	3.4	41
					04						K6.04 - Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF: Nuclear boiler instrumentation. (CFR: 41.7 / 45.7)	3.3	42
239002 (SF3 SRV) Safety Relief Valves			07								K4.07 - Knowledge of RELIEF/SAFETY VALVES design feature(s) and/or interlocks which provide for the following: Minimum steam pressure required to keep an SRV open or to open SRV. (CFR: 41.7)	3.1	43
259002 (SF2 RWLCS) Reactor Water Level Control								04			A3.04 - Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including: Changes in reactor feedwater flow. (CFR: 41.7 / 45.7)	3.2	44
261000 (SF9 SGTS) Standby Gas Treatment									05		A4.05 - Ability to manually operate and/or monitor in the control room: Drywell to suppression chamber/torus differential pressure: Mark-I,II. (CFR: 41.7 / 45.5 to 45.8)	2.9	45
262001 (SF6 AC) AC Electrical Distribution		01									K2.01 - Knowledge of electrical power supplies to the following: Off-site sources of power. (CFR: 41.7)	3.3	46
262002 (SF6 UPS) Uninterruptable Power Supply (AC/DC)									01		A3.01 - Ability to monitor automatic operations of the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) including: Transfer from preferred to alternate source. (CFR: 41.7 / 45.7)	2.8	47
263000 (SF6 DC) DC Electrical Distribution						01					A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the D.C. ELECTRICAL DISTRIBUTION controls including: Battery charging/discharging rate. (CFR: 41.5 / 45.5)	2.5	48
			02								K3.02 - Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION will have on following: Components using D.C. control power (i.e. breakers). (CFR: 41.7 / 45.4)	3.5	49

264000 (SF6 EGE) Emergency Generators (Diesel/Jet) EDG						01							K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the EMERGENCY GENERATORS (DIESEL/JET): Starting air. (CFR: 41.7 / 45.7)	3.8	50
						06							K5.06 - Knowledge of the operational implications of the following concepts as they apply to EMERGENCY GENERATORS (DIESEL/JET): Load sequencing. (CFR: 41.5 / 45.3)	3.4	51
300000 (SF8 IA) Instrument Air								01					A2.01 - Ability to (a) predict the impacts of the following on the INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Air dryer and filter malfunctions. (CFR: 41.5 / 45.6)	2.9	52
400000 (SF8 CCS) Component Cooling Water					01								K4.01 - Knowledge of CCWS design feature(s) and or interlocks which provide for the following: Automatic start of standby pump. (CFR: 41.7)	3.4	53
510000 (SF4 SWS*) Service Water (Normal and Emergency)															
K/A Category Point Totals:	1	3	3	2	3	2	2	3	3	2	2	Group Point Total:		26	

ES-401	BWR Examination Outline Plant Systems—Tier 2/Group 2 (RO)											Form ES-401-1		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
201001 (SF1 CRDH) CRD Hydraulic		03										K2.03 - Knowledge of electrical power supplies to the following: Backup SCRAM valve solenoids. (CFR: 41.7)	3.5	54
201002 (SF1 RMCS) Reactor Manual Control														
201003 (SF1 CRDM) Control Rod and Drive Mechanism														
201004 (SF7 RSCS) Rod Sequence Control														
201005 (SF1, SF7 RCIS) Rod Control and Information														
201006 (SF7 RWMS) Rod Worth Minimizer														
202001 (SF1, SF4 RS) Recirculation							09					A1.09 - Ability to predict and/or monitor changes in parameters associated with operating the RECIRCULATION SYSTEM controls including: Recirculation pump seal pressures. (CFR: 41.5 / 45.5)	3.3	55
202002 (SF1 RSCTL) Recirculation Flow Control														
204000 (SF2 RWCU) Reactor Water Cleanup			04									K4.04 - Knowledge of REACTOR WATER CLEANUP SYSTEM design feature(s) and/or interlocks which provide for the following: System isolation upon-receipt of isolation signals. (CFR: 41.7)	3.5	56
214000 (SF7 RPIS) Rod Position Information								01				A2.01 - Ability to (a) predict the impacts of the following on the ROD POSITION INFORMATION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failed reed switches. (CFR: 41.5 / 45.6)	3.1	57
215001 (SF7 TIP) Traversing In-Core Probe														
215002 (SF7 RBMS) Rod Block Monitor														
216000 (SF7 NBI) Nuclear Boiler Instrumentation											04.20	Generic 2.4.20 - Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)	3.8	58
219000 (SF5 RHR SPC) RHR/LPCI: Torus/Suppression Pool Cooling Mode										01		A3.01 - Ability to monitor automatic operations of the RHR/LPCI:TORUS/SUPPRESSION POOL COOLING MODE including: Valve operation. (CFR: 41.7 / 45.7)	3.3	59
223001 (SF5 PCS) Primary Containment and Auxiliaries														
226001 (SF5 RHR CSS) RHR/LPCI: Containment Spray Mode			02									K3.02 - Knowledge of the effect that a loss or malfunction of the RHR/LPCI:CONTAINMENT SPRAY SYSTEM MODE will have on following: Containment/drywell/suppression chamber temperature. (CFR: 41.7 / 45.4)	3.5	60

Facility: Fermi		Date of Exam: 5/24/2021 – 6/2/2021				
Category	K/A #	Topic	RO		SRO-only	
			IR	#	IR	#
1. Conduct of Operations	G2.1.26	Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen). (CFR: 41.10 / 45.12)	3.4	66		
	G2.1.39	Knowledge of conservative decision making practices. (CFR: 41.10 / 43.5 / 45.12)	3.6	67		
	Subtotal				2	
2. Equipment Control	G2.2.6	Knowledge of the process for making changes to procedures. (CFR: 41.10 / 43.3 / 45.13)	3.0	68		
	G2.2.13	Knowledge of tagging and clearance procedures. (CFR: 41.10 / 45.13)	4.1	69		
	G2.2.35	Ability to determine Technical Specification Mode of Operation. (CFR: 41.7 / 41.10 / 43.2 / 45.13)	3.6	70		
	Subtotal				3	
3. Radiation Control	G2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)	3.2	71		
	G2.3.12	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. (CFR: 41.12 / 45.9 / 45.10)	3.2	72		
	Subtotal				2	
4. Emergency Procedures/Plan	G2.4.39	Knowledge of RO responsibilities in emergency plan implementation. (CFR: 41.10 / 45.11)	3.9	73		
	G2.4.42	Knowledge of emergency response facilities. (CFR: 41.10 / 45.11)	2.6	74		
	G2.4.43	Knowledge of emergency communication systems and techniques. (CFR: 41.10 / 45.13)	3.2	75		
	Subtotal				3	
Tier 3 Point Total				10		7