1

Form ES-401-1

Facility: <b>Fermi</b>			Date of Exam: January 2020   SRO-ONLY Points   SRO-ONLY Points   K2 K3 K4 K5 K6 A1 A2 A3 A4 G* Total A2 A G* Total   3 4 7 1 1 1 1 7 1 7															
Tier	Group					RO 🖡	K/A C	ateg	jory l	Point	ts				SR	O-Onl	y Poin	its
		K1	K2	К3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A	2	G	)*	Total
1.	1	3	3	4				4	3			3	20	4	1	3	3	7
Emergency and Abnormal Plant	2	2	1	1		N/A		1	1	N	/A	1	7		1	2	2	3
Evolutions	Tier Totals	5	4	5				5	4			4	27	Ę	5	Ę	5	10
2	1	2	2	3	2	3	2	3	2	2	3	2	26	:	3	2	2	5
Plant	2	1	1	1	1	1	2	1	1	1	1	1	12	0	1	2	2	3
Systems	Tier Totals	3	3	4	3	4	4	4	3	3	4	3	38	2	1	2	1	8
3. Generic ł	Knowledge and	Abili	ties			1		2	(	3		4	10	1	2	3	4	7
	Categories					3	2	2		2	:	3		2	2	1	2	

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-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.)

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.

2

ES-401 Emergence	cy ar	nd Ab	BWR norm	Exar al Pla	minat ant E	ion O volutio	utline ons—Tier 1/Group 1 (RO)	Form	ES-401-1
E/APE # / Name / Safety Function	K1	K2	КЗ	A1	A2	G*	K/A Topic(s)	IR	#
295001 (APE 1) Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4			06				AK3.06 – Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Core flow indication. (CFR: 41.5 / 45.6)	2.9	1
295003 (APE 3) Partial or Complete Loss of AC Power / 6				02			AA1.02 – Ability o operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF AC POWER: Emergency generators. (CFR: 41.7 / 45.6)	4.2	2
295004 (APE 4) Partial or Total Loss of DC Power / 6					01		AA2.01 – Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF DC POWER: Cause of partial or complete loss of DC power. (CFR: 41.10 / 43.5 / 45.13)	3.2	3
295005 (APE 5) Main Turbine Generator Trip / 3						01. 20	G2.1.20 – Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)	4.6	4
295006 (APE 6) Scram / 1	03						AK1.03 – Knowledge of the operational implications of the following concepts as they apply to SCRAM: Reactivity control (CFR: 41.8 to 41.10)	3.7	5
295016 (APE 16) Control Room Abandonment / 7		01					AK2.01 – Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: Remote shutdown panel: Plant-specific (CFR: 41.7 / 45.6)	4.4	6
295018 (APE 18) Partial or Complete Loss of CCW / 8			02				AK3.02 – Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Reactor power reduction. (CFR: 41.5 / 45.6)	3.3	7
295019 (APE 19) Partial or Complete Loss of Instrument Air / 8				01			AA1.01 – Ability to operate and/or monitor the following as thy apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Backup air supply. (CFR: 41.7 / 45.6)	3.5	8
295021 (APE 21) Loss of Shutdown Cooling / 4					02		AA2.02 – Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING: RHR/Shutdown cooling system flow. (CFR: 41.10 / 43.5 / 45.13)	3.4	9
295023 (APE 23) Refueling Accidents / 8						01. 07	G2.1.7 – Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation. (CFR: 41.5 / 43.5 / 45.12, 45.13)	4.4	10
295024 High Drywell Pressure / 5	01						EK1.01 – Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE: Drywell integrity: Plant-specific. (CFR: 41.8 to 41.10)	4.1	11
295025 (EPE 2) High Reactor Pressure / 3		08					EK2.08 – Knowledge of the interrelations between HIGH REACTOR PRESSURE and the following: Reactor/turbine regulating system: Plant-specific. (CFR: 41.7 / 45.8)	3.7	12

3

295026 (EPE 3) Suppression Pool High Water Temperature / 5			02				EK3.02 – Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Suppression pool cooling. (CFR: 41.5 / 45.6)	3.9	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			EA1.01 – Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell spray: Mark-1&II. (CFR: 41.7 / 45.6)	3.8	14
295030 (EPE 7) Low Suppression Pool Water Level / 5					02		EA2.03 – Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Reactor pressure. (CFR: 41.10 / 43.5 / 45.13)	3.7	15
295031 (EPE 8) Reactor Low Water Level / 2						04. 49	G2.4.49 – 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)	4.6	16
295037 (EPE 14) Scram Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	06						EK1.06 – Knowledge of the operational implications of the following concepts as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Cooldown effects on reactor power. (CFR: 41.8 to 41.10)	4.0	17
295038 (EPE 15) High Offsite Radioactivity Release Rate / 9		03					A <del>K2.03 Knowledge of the interrelatione between HICH OFF SITE RELEASE RATE and the following: Off gas system. (CFR: 41.7 / 45.8)</del>	<del>3.3</del>	
							EK2.03 – Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Plant ventilation system. (CFR: 41.7 / 45.8)	3.6	18
600000 (APE 24) Plant Fire On Site / 8			04				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. (CFR: 41.10 / 45.8)	2.8	19
700000 (APE 25) Generator Voltage and Electric Grid Disturbances / 6				04			AA1.04 – Ability to operate and/or monitor the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Reactor controls. (CFR: 41.5, 41.10 / 45.5, 45.7, 45.8)	4.1	20
K/A Category Totals:	3	3	4	4	3	3	Group Point Total:		20

4

ES-401 Emergence	sy and	B I Abn	WR I orma	Exam al Plar	inatio	on Ou olutio	tline ns—Tier 1/Group 2 (RO)	Form	ES-401-1
E/APE # / Name / Safety Function	K1	К2	К3	A1	A2	G*	K/A Topic(s)	IR	#
295002 (APE 2) Loss of Main Condenser Vacuum / 3									
295007 (APE 7) High Reactor Pressure / 3	04						AK1.04 – Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Turbine load. (CFR: 41.8 to 41.10)	2.7	21
295008 (APE 8) High Reactor Water Level / 2									
295009 (APE 9) Low Reactor Water Level / 2									
295010 (APE 10) High Drywell Pressure / 5		01					AK2.01 – Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Suppression pool level. (CFR: 41.7 / 45.8)	3.2	22
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				AK3.02 – Knowledge of the reasons for the following responses as they apply to INADVERTENT REACTIVITY ADDITION: Control rod blocks. (CFR: 41.5 / 45.6)	3.7	23
295015 (APE 15) Incomplete Scram / 1				03			AA1.03 – Ability to operate and/or monitor the following as they apply to INCOMPLETE SCRAM: RMCS: Plant- specific. (CFR: 41.7 / 45.6)	3.6	24
295017 (APE 17) Abnormal Offsite Release Rate / 9									
295020 (APE 20) Inadvertent Containment Isolation / 5 & 7					05		AA2.05 – Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION: Reactor water level. (CFR: 41.10 / 43.5 / 45.13)	3.6	25
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						01. 20	G2.4.20 – Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)	3.8	26
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:	2	1	1	1	1	1	Group Point Total:	7

ES-401				Pl	ant	BV Sysi	VR E tems	∃xar ≩—T	nina ⁻ier∶	ation 2/Gr	Outl oup	ine Form 1 (RO)	1 ES-40	)1-1
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	x											K1.07 – Knowledge of the physical connections and/or cause-effect relationships between RHR/LPCI: INJECTINO MODE (PLANT SPECIFIC) and the following: DC electrical power. (CFR: 41.2 to 41.9 / 45.7, 45.8)	3.1	28
											02. 42	G2.2.42 – Ability to recognize system parameters that are entry-level conditions for Technical Specifications. (CFR:41.7, 41.10 / 43.2, 43.3 / 45.3)	3.9	29
205000 (SF4 SCS) Shutdown Cooling										09		Manually operate and/or monitor in the control room: System flow. (CFR: 41.7 / 45.5 to 45.8)	3.1	30
206000 (SF2, SF4 HPCIS) High-Pressure Coolant Injection									04			A3.04 – Ability to monitor automatic operations of the HIGH PRESSURE COOLANT INJECTION SYSTEM including: System lineup: BWR-2,3,4 (CFR: 41.7 / 45.7)	4.2	31
207000 (SF4 IC) Isolation (Emergency) Condenser														
209001 (SF2, SF4 LPCS) Low-Pressure Core Spray								08				A2.08 – Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Valve openings. (CFR: 41.5 / 45.6)	3.1	32
209002 (SF2, SF4 HPCS) High-Pressure Core Spray														
211000 (SF1 SLCS) Standby Liquid Control							09					A1.09 – Ability to predict and/or monitor changes in parameters associated with operating the STANDBY LIQUID CONTROL SYSTEM controls including: SBLC system lineup. (CFR: 41.5 / 45.5)	4.0	33
212000 (SF7 RPS) Reactor Protection						03						K6.03 – Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR PROTECTION SYSTEM: Nuclear boiler instrumentation. (CFR: 41.7 / 45.7)	3.5	34
215003 (SF7 IRM) Intermediate-Range Monitor					01							K5.01 – Knowledge of the operational implications of the following concepts as they apply to INTERMEDIATE RANGE MONITOR (IRM) SYSTEM: Detector operation. (CFR: 41.5 / 45.3)	2.6	35
215004 (SF7 SRMS) Source-Range Monitor			01									K3.01 – Knowledge of the effect that a loss or malfunction of the SOURCE RANGE MONITOR (SRM) SYSTEM will have on following: RPS. (CFR: 41.7 / 45.4)	3.4	36
				02								K4.02 – Knowledge of SOURCE RANGE MONITOR (SRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Reactor SCRAM signals. (CFR: 41.7)	3.4	37

7

215005 (SF7 PRMS) Average Power Range Monitor/Local Power Range Monitor			06								K3.06 – Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on following: IRM: Plant-specific. (CFR: 41.7 / 45.4)	3.5	38
217000 (SF2, SF4 RCIC) Reactor Core Isolation Cooling		03									K2.03 – Knowledge of electrical power supplies to the following: RCIC flow controller (CFR: 41.7)	2.7	39
218000 (SF3 ADS) Automatic Depressurization	06										K1.06 – Knowledge of the physical connections and/or cause-effect relationships between AUTOMATIC DEPRESSURIZATION SYSTEM and the following: Safety/relief valves (CFR: 41.2 to 41.9 / 45.7, 45.8)	3.9	40
223002 (SF5 PCIS) Primary Containment Isolation/Nuclear Steam Supply Shutoff										01. 23	G2.1.23 – 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	41
239002 (SF3 SRV) Safety Relief Valves									06		A4.06 – Ability to manually operate and/or monitor in the control room: Reactor water level. (CFR: 41.7 / 45.5 to 45.8)	3.9	42
259002 (SF2 RWLCS) Reactor Water Level Control				07							K5.07 – Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER LEVEL CONTROL SYSTEM: Turbine speed control mechanisms: TDRFP. (CFR: 41.5 / 45.3)	2.7	43
								03			A3.03 – Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including: Changes in main steam flow. (CFR: 41.7 / 45.7)	3.2	44
261000 (SF9 SGTS) Standby Gas Treatment						04					A1.04 – Ability to predict and/or monitor changes in parameters associated with operating the STANDBY GAS TREATMENT SYSTEM controls including: Secondary containment differential pressure. (CFR: 41.5 / 45.5)	3.0	45
							05				A2.05 – Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Fan trips. (CFR: 41.5 / 45.6)	3.0	46
262001 (SF6 AC) AC Electrical Distribution						03					A1.03 – Ability to predict and/or monitor changes in parameters associated with operating the AC ELECTRICAL DISTRIBUTION controls including: Bus voltage. (CFR: 41.5 / 45.5)	2.9	47
262002 (SF6 UPS) Uninterruptable Power Supply (AC/DC)					03						K6.03 – Knowledge of the effect that a loss or malfunction of the following will have on the UNINTERRUPTIBLE POWER SUPPLY (AC/DC): Static inverter. (CFR: 41.7 / 45.7)	2.7	48
263000 (SF6 DC) DC Electrical Distribution				01							K5.01 – Knowledge of the operational implications of the following concepts as they apply to DC ELECTRICAL DISTRIBUTION: Hydrogen generation during battery charging (CFR: 41.5 / 45.3)	2.6	49

8

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264000 (SF6 EGE) Emergency Generators (Diesel/Jet) EDG				06								K4.06 - Knowledge of EMERGENCY2.6GENERATORS (DIESEL/JET) designfeature(s) and/or interlocks which providefor the following: Governor control.(CFR: 41.7)	50
										02		A4.02 – Ability to manually operate and/or monitor in the control room: Synchroscope (CFR: 41.7 / 45.5 to 45.8)	51
300000 (SF8 IA) Instrument Air			02									K3.02 – Knowledge of the effect that a loss or malfunction of the (INSTRUMENT AIR SYSTEM) will have on the following: Systems having pneumatic valves and controls. (CFR: 41.7 / 45.6)	52
400000 (SF8 CCS) Component Cooling Water		02										K2.02 – Knowledge of the electrical power 2.9 supplies to the following: CCW valves. (CFR: 41.7)	53
510000 (SF4 SWS*) Service Water (Normal and Emergency)													
K/A Category Point Totals:	2	2	3	2	3	2	3	2	2	3	2	Group Point Total:	26

9

ES-401		Р	B lant	WR Syst	Exa ems	mina —Tie	ition er 2/	Outl Groι	ine ıp 2	(RO)	)	Form E	ES-401-	1
System # / Name	К1	K2	КЗ	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
201001 (SF1 CRDH) CRD Hydraulic						05						K6.05 – Knowledge of the effect that a loss or malfunction of the following will have on the CONTROL ROD DRIVE HYDRAULIC system: AC power. (CFR: 41.7 / 45.7)	3.3	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							02					A1.02 – Ability to predict and/or monitor changes in parameters associated with operating the ROD WORTH MINIMIZER SYSTEM (RWM) (PLANT SPECIFIC) controls including: Status of control rod movement blocks; P-spec (Not-BWR6) (CFR: 41.5 / 45.5)	3.4	55
202001 (SF1, SF4 RS) Recirculation								13				A2.13 – Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Carryunder. (CFR: 41.5 / 45.6)	2.6	56
202002 (SF1 RSCTL) Recirculation Flow Control														
204000 (SF2 RWCU) Reactor Water Cleanup									03			A3.03 – Ability to monitor automatic operations of the REACTOR WATER CLEANUP SYSTEM including: Response to system isolations. (CFR: 41.7 / 45.7)	3.6	57
214000 (SF7 RPIS) Rod Position Information														
215001 (SF7 TIP) Traversing In-Core Probe														
215002 (SF7 RBMS) Rod Block Monitor										03		A4.03 – Ability to manually operate and/or monitor in the control room: Trip bypasses: BWR-3,4,5 (CFR: 41.7 / 45.5 to 45.8)	2.8	58
216000 (SF7 NBI) Nuclear Boiler Instrumentation												· · · · · · · · · · · · · · · · · · ·		
219000 (SF5 RHR SPC) RHR/LPCI: Torus/Suppression Pool Cooling Mode											02. 12	G2.2.12 – Knowledge of surveillance procedures. (CFR: 41.10 / 45.13)	3.7	59
223001 (SF5 PCS) Primary Containment and Auxiliaries														
226001 (SF5 RHR CSS) RHR/LPCI: Containment Spray Mode														
230000 (SF5 RHR SPS) RHR/LPCI: Torus/Suppression Pool Spray Mode														
233000 (SF9 FPCCU) Fuel Pool Cooling/Cleanup														
234000 (SF8 FH) Fuel-Handling Equipment														
239001 (SF3, SF4 MRSS) Main and Reheat Steam		01										K2.01 – Knowledge of electrical power supplies to the following: Main steam isolation valve solenoids. (CFR: 41.7)	3.2	60
239003 (SF9 MSVLCS) Main Steam Isolation Valve Leakage Control														
241000 (SF3 RTPRS) Reactor/Turbine Pressure Regulating														
245000 (SF4 MTGEN) Main Turbine Generator/Auxiliary														
256000 (SF2 CDS) Condensate														
259001 (SF2 FWS) Feedwater														

10

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268000 (SF9 RW) Radwaste	09											K1.09 – Knowledge of the physical connections and/or cause-effect	2.6	61
												relationships between RADWASTE and		
												the following: ECCS systems.		
												(CFR: 41.2 to 41.9 / 45.7, 45.8)		
271000 (SF9 OG) Offgas			02									K3.02 – Knowledge of the effect that a loss or malfunction of the OFFGAS SYSTEM will have on the following: Off- site radioactive release rate. (CFR: 41.57.45.3)	3.3	62
272000 (SF7, SF9 RMS) Radiation Monitoring														
286000 (SF8 FPS) Fire Protection				02								K4.02 – Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Automatic system initiation. (CFR: 41.5 / 45.7)	3.3	63
288000 (SF9 PVS) Plant Ventilation														
290001 (SF5 SC) Secondary Containment														
290003 (SF9 CRV) Control Room Ventilation					03							K5.03 – Knowledge of the operational implications of the following concepts as they apply to CONTROL ROOM HVAC: Temperature control. (CFR: 41.5 / 45.3)	2.6	64
290002 (SF4 RVI) Reactor Vessel Internals						07						K6.07 – Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR VESSEL INTERNALS: RWCU. (CFR: 41.7 / 45.7)	2.6	65
51001 (SF8 CWS*) Circulating Water														
K/A Category Point Totals:	1	1	1	1	1	2	1	1	1	1	1	Group Point Total:		12

11

ES-401 Emergency	/ and	d Abr	BWR Iorma	Exar Il Pla	ninat nt Ev	ion O olutio	utline ns—Tier 1/Group 1 (SRO)	Form I	ES-401-1
E/APE # / Name / Safety Function	K1	К2	К3	A1	A2	G*	K/A Topic(s)	IR	#
295001 (APE 1) Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					04		AA2.04 – Ability to determine and/or interpret the following they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Individual jet pump flows: Not-BWR-1&2. (CFR: 41.10 / 43.5 / 45.13)	3.1	76
295003 (APE 3) Partial or Complete Loss of AC Power / 6									
295004 (APE 4) Partial or Total Loss of DC Power / 6									
295005 (APE 5) Main Turbine Generator Trip / 3						02. 44	G2.2.44 – Ability to interpret control room indications to verify the status and operation of a system and understand how operator actions and directives affect plant and system conditions. (CFR: 41.5 / 43.5 / 45.12)	4.4	77
295006 (APE 6) Scram / 1									
295016 (APE 16) Control Room Abandonment / 7					01		AA2.01 – Ability to determine and/or interpret the following as they apply to CONTROL ROOM ABANDONMENT: Reactor power. (CFR: 41.10 / 43.5 / 45.13)	4.1	78
295018 (APE 18) Partial or Complete Loss of CCW / 8						04. 31	G2.4.31 – Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)	4.1	79
295019 (APE 19) Partial or Complete Loss of Instrument Air / 8									
295021 (APE 21) Loss of Shutdown Cooling / 4									
295023 (APE 23) Refueling Accidents / 8									
295024 High Drywell Pressure / 5									
295025 (EPE 2) High Reactor Pressure / 3									
295026 (EPE 3) Suppression Pool High Water Temperature / 5									
295027 (EPE 4) High Containment Temperature (Mark III Containment Only) / 5									
295028 (EPE 5) High Drywell Temperature (Mark I and Mark II only) / 5									
295030 (EPE 7) Low Suppression Pool Water Level / 5					02		EA2.02 – Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Suppression pool temperature. (CFR: 41.10 / 43.5 / 45.13)	3.9	80
295031 (EPE 8) Reactor Low Water Level / 2									
295037 (EPE 14) Scram Condition Present and Reactor Power Above APRM Downscale or Unknown / 1						04. 08	G2.4.8 – Knowledge of how abnormal operating procedures are used in conjunction with EOPs. (CFR: 41.10 / 43.5 / 45.13)	4.5	81
295038 (EPE 15) High Offsite Radioactivity Release Rate / 9									
600000 (APE 24) Plant Fire On Site / 8									

ES-401		12	2	For	m E	S-401-1
700000 (APE 25) Generator Voltage and Electric Grid Disturbances / 6		07		AA2.07 – Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Operational status of engineered safety features. (CFR: 41.5 / 43.5 / 45.5, 45.7, 45.8)	4.0	82
K/A Category Totals:		4	3	Group Point Total:		7

ES-401 BWR Examination Outline Form E Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (SRO)												
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												
295007 (APE 7) High Reactor Pressure / 3												
295008 (APE 8) High Reactor Water Level / 2												
295009 (APE 9) Low Reactor Water Level / 2												
295010 (APE 10) High Drywell Pressure / 5												
295011 (APE 11) High Containment Temperature (Mark III Containment only) / 5												
295012 (APE 12) High Drywell Temperature / 5						04. 18	G2.4.18 – Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)	4.0	83			
295013 (APE 13) High Suppression Pool Temperature. / 5												
295014 (APE 14) Inadvertent Reactivity Addition / 1												
295015 (APE 15) Incomplete Scram / 1												
295017 (APE 17) Abnormal Offsite Release Rate / 9												
295020 (APE 20) Inadvertent Containment Isolation / 5 & 7												
295022 (APE 22) Loss of Control Rod Drive Pumps / 1					01		AA2.01 – Ability to determine and/or interpret the following as they apply to LOSS OF CRD PUMPS: Accumulator pressure. (CFR: 41.10 / 43.5 / 45.13)	3.6	84			
295029 (EPE 6) High Suppression Pool Water Level / 5						04- 03	G2.4.3 – Ability to identify post-accident instrumentation. (CFR: 41.6 / 45.4)	3.9	85			
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												
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	2	Group Point Total:		3			

ES-401 BWR Examination Outline Form ES-401 Plant Systems—Tier 2/Group 1 (SRO)														01-1
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
203000 (SF2, SF4 RHR/LPCI)														
205000 (SE4 SCS) Shutdown Cooling		_	_				_							
206000 (SF2, SF4 HPCIS) High-Pressure Coolant Injection								17				A2.17 – 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: HPCI inadvertent initiation: BWR-2,3,4. (CFR: 41.5 / 45.6)	4.3	86
207000 (SF4 IC) Isolation (Emergency) Condenser														
209001 (SF2, SF4 LPCS) Low-Pressure Core Spray														
High-Pressure Core Spray														
211000 (SF1 SLCS) Standby Liquid Control														
212000 (SF7 RPS) Reactor Protection														
215003 (SF7 IRM) Intermediate-Range Monitor											02. 36	G2.2.36 – Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13)	4.5	87
215004 (SF7 SRMS) Source-Range Monitor														
215005 (SF7 PRMS) Average Power Range Monitor/Local Power Range Monitor														
217000 (SF2, SF4 RCIC) Reactor Core Isolation Cooling								11				A2.11 - Ability to (a) predict the impacts of the following on the REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM: and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Inadequate system flow. (CFR: 41.5 / 45.6)	3.2	88
218000 (SF3 ADS) Automatic Depressurization														
223002 (SF5 PCIS) Primary Containment Isolation/Nuclear Steam Supply Shutoff											02. 37	G2.2.37 – Ability to determine operability and/or availability of safety related equipment. (CFR: 41.7 / 43.5 / 45.12)	4.6	89
239002 (SF3 SRV) Safety Relief Valves														
259002 (SF2 RWLCS) Reactor Water Level Control														
261000 (SF9 SGTS) Standby Gas Treatment														
262001 (SF6 AC) AC Electrical Distribution														
262002 (SF6 UPS) Uninterruptable Power Supply (AC/DC)														

								-
263000 (SF6 DC) DC Electrical Distribution				01			A2.01 – Ability to (a) predict the impacts of the following on the DC ELECTRICAL DISTRUBTION: and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Grounds. (CFR: 41.5 / 45.6)	90
264000 (SF6 EGE) Emergency Generators (Diesel/Jet) EDG								
300000 (SF8 IA) Instrument Air								
400000 (SF8 CCS) Component Cooling Water								
510000 (SF4 SWS*) Service Water (Normal and Emergency)								
K/A Category Point Totals:				3		2	Group Point Total:	5

ES-401 BWR Examination Outline Form ES-401-1 Plant Systems—Tier 2/Group 2 (SRO)														1
System # / Name	K1	К2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
201001 (SF1 CRDH) CRD Hydraulic														
201002 (SF1 RMCS) Reactor Manual Control														
201003 (SF1 CRDM) Control Rod and Drive Mechanism											02. 40	G2.2.40 – Ability to apply Technical Specifications for a system. (CFR: 41.10 / 43.2, 43.5 / 45.3)	4.7	91
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														
202002 (SF1 RSCTL) Recirculation Flow Control														
204000 (SF2 RWCU) Reactor Water Cleanup														
214000 (SF7 RPIS) Rod Position Information														
215001 (SF7 TIP) Traversing In-Core Probe														
215002 (SF7 RBMS) Rod Block Monitor														
216000 (SF7 NBI) Nuclear Boiler Instrumentation								03				A2.03 – Ability to (a) predict the impacts of the following on the NUCLEAR BOILER INSTRUMENTATION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Instrument line leakage. (CFR: 41.5 / 45.6)	3.1	92
219000 (SF5 RHR SPC) RHR/LPCI: Torus/Suppression Pool Cooling Mode														
223001 (SF5 PCS) Primary Containment and Auxiliaries														
226001 (SF5 RHR CSS) RHR/LPCI: Containment Spray Mode														
230000 (SF5 RHR SPS) RHR/LPCI: Torus/Suppression Pool Spray Mode														
233000 (SF9 FPCCU) Fuel Pool Cooling/Cleanup														
234000 (SF8 FH) Fuel-Handling Equipment														
239001 (SF3, SF4 MRSS) Main and Reheat Steam														
239003 (SF9 MSVLCS) Main Steam Isolation Valve Leakage Control														
241000 (SF3 RTPRS) Reactor/Turbine Pressure Regulating											04. 46	G2.4.46 – Ability to verify that alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3, 45.12)	4.2	93
245000 (SF4 MTGEN) Main Turbine Generator/Auxiliary														
256000 (SF2 CDS) Condensate														
259001 (SF2 FWS) Feedwater														
268000 (SF9 RW) Radwaste														
271000 (SF9 OG) Offgas														
272000 (SF7, SF9 RMS) Radiation Monitoring														
286000 (SF8 FPS) Fire Protection														
288000 (SF9 PVS) Plant Ventilation														
290001 (SF5 SC) Secondary Containment														
290003 (SF9 CRV) Control Room Ventilation														
290002 (SF4 RVI) Reactor Vessel Internals														

ES-401	17													Form ES-401-1		
51001 (SF8 CWS*) Circulating Water																
K/A Category Point Totals:								1			2	Group Point Total:		3		