

Facility: **Davis-Besse RO**

Date of Exam **6/15 thru 6/26 2015**

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	3	3				3	3			3	18				
	2	2	2	1				2	1			1	9				
	Tier Totals	5	5	4				5	4			4	27				
2. Plant Systems	1	2	2	3	3	3	2	2	3	2	3	3	28				
	2	1	1	1	1	1	1	1	0	1	1	1	10				
	Tier Totals	3	3	4	4	4	3	3	3	3	4	4	38				
3. Generic Knowledge and Abilities Category				1		2		3		4		10		1	2	3	4
				2		3		3		2							

Note:

- 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 Davis-Besse 6/2015	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1(RO)						Form ES-401-2		
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000007 Reactor Trip Question 1						X	2.1.28 Knowledge of the purpose and function of major system components and controls. (CFR: 41.7)	4.1	1
000008 Pressurizer (PZR) Vapor Space Accident Question 2		X					AK2.02 Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Sensors and detectors (CFR 41.7 / 45.7)	2.7*	1
000009 Small Break LOCA Question 3						X	2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)	3.9	1
000011 Large Break LOCA Question 4			X				EK3.15 Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Criteria for shifting to recirculation mode (CFR 41.5 / 41.10 / 45.6 / 45.13)	4.3	1
000015/000017 Reactor Coolant Pump (RCP) Malfunctions Question 5	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): Consequences of an RCPS failure (CFR 41.8 / 41.10 / 45.3)	3.7	1
000026 Loss of Component Cooling Water (CCW) Question 6				X			AA1.02 Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: Loads on the CCWS in the control room (CFR 41.7 / 45.5 / 45.6)	3.2	1
000029 Anticipated Transient Without Scram (ATWS) Question 7		X					EK2.06 Knowledge of the interrelations between the following and an ATWS: Breakers, relays, and disconnects (CFR 41.7 / 45.7)	2.9*	1
000038 Steam Generator Tube Rupture (SGTR) Question 8			X				EK3.08 Knowledge of the reasons for the following responses as they apply to the SGTR: Criteria for securing RCP (CFR 41.5 / 41.10 / 45.6 / 45.13)	4.1	1
000054 Loss of Main Feedwater (MFW) Question 9				X			AA1.01 Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): AFW controls, including the use of alternate AFW sources (CFR 41.7 / 45.5 / 45.6)	4.5	1
000055 Loss of Offsite and Onsite Power (Station Blackout) Question 10	X						EK1.01 Knowledge of the operational implications of the following concepts as they apply to the Station Blackout : Effect of battery discharge rates on capacity (CFR 41.8 / 41.10 / 45.3)	3.3	1
000056 Loss of Offsite Power Question 11					X		AA2.57 Ability to determine and interpret the following as they apply to the Loss of Offsite Power: RCS hot-leg and cold-leg temperatures (CFR: 43.5 / 45.13)	3.9	1
000057 Loss of Vital AC Electrical Instrument Bus Question 12				X			AA1.01 Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual inverter swapping (CFR 41.7 / 45.5 / 45.6)	3.7*	1

ES-401 Davis-Besse 6/2015		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1(RO) <i>Continued</i>						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000058 Loss of DC Power Question 13	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation (CFR 41.8 / 41.10 / 45.3)	2.8	1
000062 Loss of Nuclear Service Water Question 14					X		AA2.03 Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition (CFR: 43.5 / 45.13)	2.6	1
000065 Loss of Instrument Air Question 15					X		AA2.07 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Whether backup nitrogen supply is controlling valve position (CFR: 43.5 / 45.13)	2.8*	1
000077 Generator Voltage and Electric Grid Disturbances Question 16		X					AK2.07 Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Turbine / generator control (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8)	3.6	1
BW/E04 Inadequate Heat Transfer - Loss Of Secondary Heat Sink Question 17						X	2.2.44 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)	4.2	1
BW/E05 Steam Line Rupture – Excessive Heat Transfer Question 18			X				EK3.4 Knowledge of the reasons for the following responses as they apply to the (Excessive Heat Transfer): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated. (CFR: 41.5 / 41.10, 45.6, 45.13)	3.8	1
K/A Category Point Totals:	3	3	3	3	3	3	Group Point Total:		18

ES-401 Davis-Besse 6/2015		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2(RO)						Form ES-401-2		
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points	
000005 Inoperable/Stuck Control Rod Question 19				X			AA1.04 Ability to operate and / or monitor the following as they apply to the Inoperable / Stuck Control Rod: Reactor and turbine power (CFR 41.7 / 45.5 / 45.6)	3.9	1	
000028 Pressurizer (PZR) Level Control Malfunction Question 20	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leak abnormalities (CFR 41.8 / 41.10 / 45.3)	2.8*	1	
000032 Loss of Source Range Nuclear Instrumentation Question 21		X					AK2.01 Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: Power supplies, including proper switch positions (CFR 41.7 / 45.7)	2.7*	1	
000069 Loss of Containment Integrity Question 22	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Loss of Containment Integrity: Effect of pressure on leak rate (CFR 41.8 / 41.10 / 45.3)	2.6	1	
000076 High Reactor Coolant Activity Question 23				X			AA1.04 Ability to operate and / or monitor the following as they apply to the High Reactor Coolant Activity: Failed fuel-monitoring equipment (CFR 41.7 / 45.5 / 45.6)	3.2	1	
BW/A01 Plant Runback Question 24		X					AK2.1 Knowledge of the interrelations between the (Plant Runback) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. (CFR: 41.7 / 45.7)	3.7	1	
BW/A07 Flooding Question 25					X		AA2.1 Ability to determine and interpret the following as they apply to the (Flooding): Facility conditions and selection of appropriate procedures during abnormal and emergency operations (CFR: 43.5 / 45.13)	3.0	1	
BW/E09 Natural Circulation Cooldown Question 26			X				EK3.3 Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Cooldown): Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations (CFR: 41.5 / 41.10, 45.6, 45.13)	3.8	1	
BW/E13 EOP Rules Question 27						X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm (CFR: 41.10 / 43.5 / 45.3 / 45.12)	4.1	1	
K/A Category Point Totals:	2	2	1	2	1	1	Group Point Total:		9	

ES-401 Davis-Besse 6/2015		PWR Examination Outline Plant Systems - Tier 2/Group 1(RO)										Form ES-401-2		
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	Points
003 Reactor Coolant Pump System (RCPS) Question 28											X	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation (CFR: 41.5 / 43.5 / 45.12 / 45.13)	4.4	1
003 Reactor Coolant Pump System (RCPS) Question 29			X									K3.01 Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: RCS (CFR: 41.7 / 45.6)	3.7	1
004 Chemical and Volume Control System Question 30						X						K6.26 Knowledge of the effect of a loss or malfunction on the following CVCS components: Methods of pressure control of solid plant (PZR relief and water inventory) (CFR: 41.7 / 45.7)	3.8	1
005 Residual Heat Removal System (RHRS) Question 31				X								K4.08 Knowledge of RHRS design feature(s) and/or interlock(s) which provide or the following: Lineup for "piggy-back" mode with high-pressure injection (CFR: 41.7)	3.1*	1
006 Emergency Core Cooling System (ECCS) Question 32		X										K2.01 Knowledge of bus power supplies to the following: ECCS pumps (CFR: 41.7)	3.6	1
006 Emergency Core Cooling System (ECCS) Question 33											X	2.4.1 Knowledge of EOP entry conditions and immediate action steps (CFR: 41.10 / 43.5 / 45.13)	4.6	1
007 Pressurizer Relief Tank /Quench Tank System (PRTS) Question 34									X			A3.01 Ability to monitor automatic operation of the PRTS, including: Components which discharge to the PRT (CFR: 41.7 / 45.5)	2.7*	1
008 Component Cooling Water System (CCWS) Question 35										X		A4.02 Ability to manually operate and/or monitor in the control room: Filling and draining operations of the CCWS including the proper venting of the components (CFR: 41.7 / 45.5)	2.5*	1
008 Component Cooling Water System (CCWS) Question 36								X				A2.05 Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of loss of instrument and control air on the position of the CCW valves that are air operated (CFR: 41.5 / 43.5 / 45.3 / 45.13)	3.3*	1
010 Pressurizer Pressure Control System (PZR PCS) Question 37					X							K5.02 Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Constant enthalpy expansion through a valve (CFR: 41.5 / 45.7)	2.6	1

System # / Name	K	K	K	K	K	K	A	A	A	A	G	K/A Topic(s)	IR	Points
	1	2	3	4	5	6	1	2	3	4				
012 Reactor Protection System (RPS) Question 38			X									K3.03 Knowledge of the effect that a loss or malfunction of the RPS will have on the following: SDS (CFR: 41.7 / 45.6)	3.1*	1
012 Reactor Protection System (RPS) Question 39						X						K6.11 Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Trip setpoint calculators (CFR: 41.7 / 45/7)	2.9*	1
013 Engineered Safety Features Actuation System (ESFAS) Question 40					X							K5.01 Knowledge of the operational implications of the following concepts as they apply to the ESFAS: Definitions of safety train and ESF channel (CFR: 41.5 / 45.7)	2.8	1
022 Containment Cooling System (CCS) Question 41		X										K2.01 Knowledge of power supplies to the following: Containment cooling fans (CFR: 41.7)	3.0*	1
026 Containment Spray System (CSS) Question 42							X					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure (CFR: 41.5 / 45.5)	3.9	1
039 Main and Reheat Steam System (MRSS) Question 43				X								K4.07 Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Reactor building isolation (CFR: 41.7)	3.4	1
059 Main Feedwater (MFW) System Question 44				X								K4.18 Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater reduction on plant trip (CFR: 41.7)	2.8*	1
061 Auxiliary / Emergency Feedwater (AFW) System Question 45					X							K5.05 Knowledge of the operational implications of the following concepts as the apply to the AFW: Feed line voiding and water hammer (CFR: 41.5 / 45.7)	2.7	1
061 Auxiliary / Emergency Feedwater (AFW) System Question 46											X	2.4.35 Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects (CFR: 41.10 / 43.5 / 45.13)	3.8	1
062 AC Electrical Distribution System Question 47							X					A1.03 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including: Effect on instrumentation and controls of switching power supplies (CFR: 41.5 / 45.5)	2.5	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	Points
063 DC Electrical Distribution System Question 48	X											K1.03 Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: Battery charger and battery (CFR: 41.2 to 41.9 / 45.7 to 45.8)	2.9	1
064 Emergency Diesel Generator (ED/G) System Question 49			X									K3.01 Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: Systems controlled by automatic loader (CFR: 41.7 / 45.6)	3.8*	1
064 Emergency Diesel Generator (ED/G) System Question 50	X											K1.02 Knowledge of the physical connections and/or cause-effect relationships between the ED/G system and the following systems: D/G cooling water system (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.1	1
073 Process Radiation Monitoring (PRM) System Question 51										X		A4.01 Ability to manually operate and/or monitor in the control room: Effluent release (CFR: 41.7 / 45.5 to 45.8)	3.9	1
076 Service Water System (SWS) Question 52								X				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Service water header pressure (CFR: 41.5 / 43.5 / 45.3 / 45.13)	2.7	1
078 Instrument Air System (IAS) Question 53										X		A4.01 Ability to manually operate and/or monitor in the control room: Pressure gauges (CFR: 41.7 / 45.5 to 45.8)	3.1	1
078 Instrument Air System (IAS) Question 54									X			A3.01 Ability to monitor automatic operation of the IAS, including: Air pressure (CFR: 41.7 / 45.5)	3.1	1
103 Containment System Question 55								X				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Phase A and B isolation (CFR: 41.5 / 43.5 / 45.3 / 45.13)	3.5*	1
K/A Category Point Totals:	2	2	3	3	3	2	2	3	2	3	3		Group Point Total:	28

ES-401 Davis-Besse 6/2015		PWR Examination Outline Plant Systems - Tier 2/Group 2(RO)										Form ES-401-2		
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	Points
001 Control Rod Drive Question 56				X								K4.11 Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Resetting of CRDM circuit breakers (CFR: 41.7)	2.7	1
002 Reactor Coolant System (RCS) Question 57										X		A4.01 Ability to manually operate and/or monitor in the control room: RCS leakage calculation program using the computer (CFR: 41.7 / 45.5 to 45.8)	3.5*	1
011 Pressurizer Level Control System Question 58		X										K2.01 Knowledge of bus power supplies to the following: Charging pumps (CFR: 41.7)	3.1	1
015 Nuclear Instrumentation System Question 59						X						K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the NIS: Component interconnections (CFR: 41.7 / 45.7)	2.6	1
016 Non-nuclear Instrumentation Question 60					X							K5.01 Knowledge of the operational implication of the following concepts as they apply to the NNIS: Separation of control and protection circuits (CFR: 41.5 / 45.7)	2.7*	1
033 Spent Fuel Pool Cooling Question 61											X	2.4.11 Knowledge of abnormal condition procedures (CFR: 41.10 / 43.5 / 45.13)	4.0	1
035 Steam Generator Question 62							X					A1.02 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the S/GS controls including: S/G pressure (CFR: 41.5 / 45.5)	3.5	1
041 Steam Dump/Turbine Bypass Control Question 63			X									K3.02 Knowledge of the effect that a loss or malfunction of the SDS will have on the following: RCS (CFR: 41.7 / 45.6)	3.8	1
045 Main Turbine Generator Question 64									X			A3.11 Ability to monitor automatic operation of the MT/G system, including: Generator trip (CFR: 41.7 / 45.5)	2.6*	1
086 Fire Protection System (FPS) Question 65	X											K1.03 Knowledge of the physical connections and/or cause-effect relationships between the Fire Protection System and the following systems: AFW system (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.4*	1
K/A Category Point Totals:	1	1	1	1	1	1	1	0	1	1	1		Group Point Total:	10

ES 401		Generic Knowledge and Abilities Outline (Tier 3)			Form ES-401-3	
Facility: Davis-Besse RO			Date of Exam 6/15 thru 6/26 2015			
Category	K/A#	Topic	RO		SRO Only	
			IR	Points	IR	Points
1. Conduct of Operations	2.1.41	Knowledge of the Refueling process. (CFR: 41.2 / 41.10 / 43.6/ 45.13) Question 66	2.8	1		
	2.1.27	Knowledge of system purpose and/or function. (CFR: 41.7) Question 67	3.9	1		
	Subtotal			2		
2. Equipment Control	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc. (CFR: 41.10 / 43.3 / 45.13) Question 68	3.9	1		
	2.2.36	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) Question 69	3.1	1		
	2.2.38	Knowledge of conditions and limitations in the facility license. (CFR: 41.7 / 41.10 / 43.1 / 45.13) Question 70	3.6	1		
	Subtotal			3		
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10) Question 71	3.2	1		
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.11 / 41.12 / 43.4 / 45.9) Question 72	2.9	1		
	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. (CFR: 41.12 / 45.9 / 45.10) Question 73	3.2	1		
	Subtotal			3		
4. Emergency Procedures/ Plan	2.4.30	Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11) Question 74	2.7	1		
	2.4.34	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13) Question 75	4.2	1		
	Subtotal			2		
Tier 3 Point Total				10		