Form 4.1-PWR Pressurized-Water Reactor Examination Outline

Facility: Davis-Besse Date of Exam: 01/08/2024

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	3	3	3	N/A			3	3	N/A		3	18	3		3		6		
	2	2	0	1				1	2			2	8	2		2		4		
	Tier Totals	5	3	4				4	5			5	26	5		5		10		
2. Plant Systems	1	2	3	3	2	1	3	3	3	3	3	2	28	2		3		5		
	2	1	1	0	1	1	2	1	0	0	1	1	9	0	1	2		3		
	Tier Totals	3	4	3	3	2	5	4	3	3	4	3	37	3		5		8		
3. Generic Knowledge and Abilities Categories	CO		EC		RC	EM								CO	EC	RC	EM			
	2		2		1	1							6	2	2	1	2	7		
4. Theory	Reactor Theory				Thermodynamics															
	3				3								6							

Notes: CO = Conduct of Operations; EC = Equipment Control; RC = Radiation Control;
EM = Emergency Procedures/Plan

* These systems/evolutions may be eliminated from the sample when Revision 2 of the K/A catalog is used to develop the sample plan

** These systems/evolutions are only included as part of the sample (as applicable to the facility) when Revision 2 of the K/A catalog is used to develop the sample plan

Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/SRO)

E/APE # / Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000007 (EPE 7; BW E02&E10; CE E02) Reactor Trip, Stabilization, Recovery						X	(000007) (EPE 7; ~~BW E02 & E10; CE E02~~) Reactor Trip, Stabilization, Recovery / 1 (G2.1.7) CONDUCT OF OPERATIONS: 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
000008 (APE 8) Pressurizer Vapor Space Accident		X					(000008AK2.05) Knowledge of the relationship between (APE 8) PRESSURIZER VAPOR SPACE ACCIDENT / 3 and the following systems or components (CFR: 41.8 / 41.10 / 45.3): RCS	3.9	2
000009 (EPE 9) Small-Break LOCA						X	(000009) (EPE 9) Small Break LOCA / 3 (G2.4.22) EMERGENCY PROCEDURES/PLAN: Knowledge of the bases for prioritizing safety functions during abnormal and emergency operations (CFR: 41.7 / 41.10 / 43.5 / 45.12)	4.4	76
000011 (EPE 11) Large-Break LOCA			X				(000011EK3.08) Knowledge of the reasons for the following responses and/or actions as they apply to (EPE 11) LARGE-BREAK LOCA / 3 (CFR: 41.5 / 41.10 / 45.6 / 45.13): Containment sump recirculation	4.3	3
000015 (APE 15) Reactor Coolant Pump Malfunctions				X			(000015AA1.02) Ability to operate and/or monitor the following as they apply to (APE 15) REACTOR COOLANT PUMP MALFUNCTIONS / 4 (CFR: 41.5 / 41.7 / 45.5 to 45.8): RCP oil reservoir level and alarm indicators	3.2	4
000022 (APE 22) Loss of Reactor Coolant Makeup					X		(000022AA2.08) Ability to determine and/or interpret the following as they apply to (APE 22) LOSS OF REACTOR COOLANT MAKEUP / 2 (CFR: 41.10 / 43.5 / 45.13): RCP seal flows, temperatures, pressures, and vibrations	3.0	5
000025 (APE 25) Loss of Residual Heat Removal System			X				(000025AK3.01) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 25) LOSS OF RESIDUAL HEAT REMOVAL SYSTEM / 4 (CFR: 41.5 / 41.10 / 45.6 / 45.13): Shift to alternate flow path	3.8	6
000026 (APE 26) Loss of Component Cooling Water	X				X		(000026AK1.02) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 26) LOSS OF COMPONENT COOLING WATER / 8 (CFR: 41.5 / 41.7 / 45.7 / 45.8): Loss of cooling to the CCWS (000026AA2.06) Ability to determine and/or interpret the following as they apply to (APE 26) LOSS OF COMPONENT COOLING WATER / 8 (CFR 41.10 / 43.5 . 45.13): The length of time after the loss of CCW flow to a component before that component may be damaged	3.8 3.3	7 77
000027 (APE 27) Pressurizer Pressure Control System Malfunction						X	(000027) (APE 27) Pressurizer Pressure Control System Malfunction / 3 (G2.2.22) EQUIPMENT CONTROL: Knowledge of limiting conditions for operation and safety limits (CFR: 41.5 / 43.2 / 45.2)	4.0	8
000029 (EPE 29) Anticipated Transient Without Scram		X					(000029EK2.17) Knowledge of the relationship between (EPE 29) ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS) / 1 and the following systems or components (CFR: 41.8 / 41.10 / 45.3): Diverse scram system (BW)	4.4	9
000038 (EPE 38) Steam Generator Tube Rupture	X						(000038EK1.03) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (EPE 38) STEAM GENERATOR TUBE RUPTURE / 3 (CFR: 41.5 / 41.7 / 45.7 / 45.8): Natural circulation	3.6	10
000040 (APE 40; BW E05; CE E05; W E12) Steam Line Rupture—Excessive Heat Transfer				X			(000040AA1.05) Ability to operate and/or monitor the following as they apply to (APE 40) STEAM LINE RUPTURE / 4 (CFR: 41.5 / 41.7 / 45.5 to 45.8): Manual and automatic RPS trip initiation	4.2	11
000054 (APE 54; CE E06) Loss of Main Feedwater					X		(000054AA2.05) Ability to determine and/or interpret the following as they apply to (APE 54) LOSS OF MAIN FEEDWATER /4 (CFR: 41.10 / 43.5 / 45.13): Status of MFW pumps, regulating and stop valves	3.0	12

000055 (EPE 55) Station Blackout	X						(000055EK1.07) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (EPE 55) STATION BLACKOUT / 6 (CFR: 41.5 / 41.7 / 45.7 / 45.8): RCP seal leakage and inventory control	4.0	13
000056 (APE 56) Loss of Offsite Power					X		(000056AA2.81) Ability to determine and/or interpret the following as they apply to (APE 56) LOSS OF OFFSITE POWER / 6 (CFR: 41.10 / 43.5 / 45.13): S/G level and pressure	3.7	78
000057 (APE 57) Loss of Vital AC Instrument Bus				X		X	(000057AA1.05) Ability to operate and/or monitor the following as they apply to (APE 57) LOSS OF VITAL AC ELECTRICAL INSTRUMENT BUS / 6 (CFR: 41.5 / 41.7 / 45.5 to 45.8): Backup instrument indications (000057) (APE 57) Loss of Vital AC Instrument Bus / 6 (G2.4.6) EMERGENCY PROCEDURES/PLAN: Knowledge of emergency and abnormal operating procedures major action categories (CFR: 41.10 / 43.5 / 45.13)	3.7 4.7	14 79
000058 (APE 58) Loss of DC Power		X				X	(000058AK2.07) Knowledge of the relationship between (APE 58) LOSS OF DC POWER / 6 and the following systems or components (CFR: 41.8 / 41.10 / 45.3): AFW (000058) (APE 58) Loss of DC Power / 6 (G2.1.8) CONDUCT OF OPERATIONS: Ability to coordinate personnel activities outside the control room (CFR: 41.10 / 43.1 / 45.5 / 45.12 / 45.13)	3.8 4.1	15 80
000062 (APE 62) Loss of Service Water					X		(000062AA2.07) Ability to determine and/or interpret the following as they apply to (APE 62) LOSS OF SERVICE WATER / 4 (CFR: 41.10 / 43.5 / 45.13): Implementation of TS requirements for loss of service water	3.0	16
000065 (APE 65) Loss of Instrument Air			X				(000065AK3.14) Knowledge of the reasons for the following responses and/or actions as they apply to (APE 65) LOSS OF INSTRUMENT AIR / 8 (CFR: 41.5 / 41.10 / 45.6 / 45.13): When to trip reactor if instrument air pressure is decreasing	4.2	17
000077 (APE 77) Generator Voltage and Electric Grid Disturbances					X		(000077AA2.06) Ability to determine and/or interpret the following as they apply to (APE 77) GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES / 6 (CFR: 41.10 / 43.5 / 45.13): Generator frequency	3.4	81
(W E04) LOCA Outside Containment									
(W E11) Loss of Emergency Coolant Recirculation									
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink						X	(BW E04; ~~W E05~~) Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4 (G2.1.30) CONDUCT OF OPERATIONS: Ability to locate and operate components, including local controls (CFR: 41.7 / 45.7)	4.4	18
K/A Category Totals:	3	3	3	3	6	6	Group Point Total:		18/6

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Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)		

E/APE # / Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000001 (APE 1) Continuous Rod Withdrawal									
000003 (APE 3) Dropped Control Rod	X						(000003AK1.04) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (APE 3) DROPPED CONTROL ROD / 1 (CFR: 41.5 / 41.7 / 45.7 / 45.8): Effect on power level and/or flux	4.0	19
000005 (APE 5) Inoperable/Stuck Control Rod					X		(000005AA2.05) Ability to determine and/or interpret the following as they apply to (APE 5) INOPERABLE/STUCK CONTROL ROD / 1 (CFR: 41.10 / 43.5 / 45.13): Ex-core NIS	3.8	20
000024 (APE 24) Emergency Boration					X		(000024AA2.05) Ability to determine and/or interpret the following as they apply to (APE 24) EMERGENCY BORATION (CFR: 43.5 / 45.13): Amount of boron to add to achieve required SDM	3.9	82
000028 (APE 28) Pressurizer Level Control Malfunction						X	(000028) (SF2 PZR LCS) PRESSURIZER LEVEL CONTROL SYSTEM (G2.4.4) EMERGENCY PROCEDURES/PLAN: 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	21
000032 (APE 32) Loss of Source Range Nuclear Instrumentation									
000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation						X	(000033) (APE 33) Loss of Intermediate Range Nuclear Instrumentation / 7 (G2.4.31) EMERGENCY PROCEDURES/PLAN: Knowledge of annunciator alarms, indications, or response procedures (CFR: 41.10 / 43.5 / 45.3 / 45.12)	4.2	22
000036 (APE 36; BW/A08) Fuel Handling Incidents									
000037 (APE 37) Steam Generator Tube Leak					X		(000037) (APE 37) (APE 037) Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Verification that the expected indication on main steam lines from the S/Gs should show increasing radiation levels (CFR: 41.7 / 41.10 / 43.5 / 45.13)	4.0	24
000051 (APE 51) Loss of Condenser Vacuum									
000059 (APE 59) Accidental Liquid Radwaste									
000060 (APE 60) Accidental Gaseous Radwaste Release									
000061 (APE 61) Area Radiation Monitoring System Alarms						X	(000061) (APE 61) Area Radiation Monitoring System Alarms / 7 (G2.1.25) CONDUCT OF OPERATIONS: Ability to interpret reference materials, such as graphs, curves, and tables (reference potential) (CFR: 41.10 / 43.5 / 45.12)	4.2	83
000067 (APE 67) Plant Fire On Site									
000068 (APE 68; BW A06) Control Room Evacuation									
000069 (APE 69; W E14) Loss of Containment									
000074 (EPE 74; W E06 & E07) Inadequate Core Cooling									
000076 (APE 76) High Reactor Coolant Activity									

000078 (APE 78*) RCS Leak						X	(000078) (APE 78*) RCS Leak / 3 (G2.4.38) EMERGENCY PROCEDURES/PLAN: Ability to take actions required by the facility emergency plan implementing procedures, including supporting or acting as emergency coordinator (CFR: 41.10 / 43.5 / 45.11)	4.4	84
(W E01 & E02) Rediagnosis & SI Termination									
(W E13) Steam Generator Overpressure									
(W E15) Containment Flooding									
(W E16) High Containment Radiation									
(BW A01) Plant Runback				X			(BWA01AA1.08) Ability to operate and/or monitor the following as they apply to (BW A01) PLANT RUNBACK / 1 (CFR: 41.5 / 41.7 / 45.5 to 45.8): ICS	3.5	23
(BW A02 & A03) Loss of NNI-X/Y									
(BW A04) Turbine Trip									
(BW A05) Emergency Diesel Actuation					X		(BWA05AA2.16) Ability to determine and/or interpret the following as they apply to (BW A05) EMERGENCY DIESEL ACTUATION / 6 (CFR: 41.10 / 43.5 / 45.13): Makeup pump, tank, valves, and/or flow	3.0	85
(BW A07) Flooding									
(BW E03) Inadequate Subcooling Margin									
(BW E08; W E03) LOCA Cooldown—Depressurization			X				(BWE08EK3.12) Knowledge of the reasons for the following responses and/or actions as they apply to (BW E08) LOCA COOLDOWN / 4 (CFR: 41.5 / 41.10 / 45.6 / 45.13): Check that LPI flow meets flow criteria to secure HPI	4	25
(BW E09; CE A13**; W E09 & E10) Natural									
(BW E13 & E14) EOP Rules and Enclosures	X						(BWE13EK1.15) Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to (BW E13) EOP RULES (CFR: 41.5 / 41.7 / 45.7 / 45.8): Tube to shell delta T	3.3	26
(CE A11**; W E08) RCS Overcooling—Pressurized Thermal Shock									
(CE A16) Excess RCS Leakage									
(CE E09) Functional Recovery									
(CE E13*) Loss of Forced Circulation/LOOP/Blackout									
K/A Category Point Totals:	2	0	1	1	4	4	Group Point Total:		8/4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
003 (SF4P RCP) Reactor Coolant Pump								X			X	(003A2.06) Ability to (a) predict the impacts of the following on the (SF4P RCP) REACTOR COOLANT PUMP SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 45.6): CCWS malfunction	3.5	27
												(003) (SF4P RCP) REACTOR COOLANT PUMP SYSTEM (G2.2.44) EQUIPMENT CONTROL: 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	28
004 (SF1; SF2 CVCS) Chemical and Volume Control					X							(004K5.11) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF1; SF2 CVCS) CHEMICAL AND VOLUME CONTROL SYSTEM (CFR: 41.5 / 45.3): PTS	3.4	29
005 (SF4P RHR) Residual Heat Removal			X								X	(005K3.01) Knowledge of the effect that a loss or malfunction of the (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.4): RCS	4.5	30
												(005) (SF4P RHR) RESIDUAL HEAT REMOVAL SYSTEM (G2.4.46) EMERGENCY PROCEDURES/PLAN: Ability to verify that the alarms are consistent with the plant conditions (CFR:M41.10 / 43.5 / 45.3 / 45.12)	4.2	86
006 (SF2; SF3 ECCS) Emergency Core Cooling	X							X				(006K1.02) Knowledge of the physical connections and/or cause and effect relationships between the (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM and the following systems (CFR: 41.2 to 41.9 / 45.7 to 45.8): ESFAS	4.4	31
												(006A2.15) Ability to (a) predict the impacts of the following on the (SF2; SF3 ECCS) EMERGENCY CORE COOLING SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5 / 45.6): Vortex/cavitation	3.5	87
007 (SF5 PRTS) Pressurizer Relief/Quench Tank				X								(007K4.05) Knowledge of (SF5 PRTS) PRESSURIZER RELIEF/QUENCH TANK SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Draining PRT/quench tank	2.6	32
008 (SF8 CCW) Component Cooling Water		X				X						(008K2.02) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF8 CCW) COMPONENT COOLING WATER SYSTEM CCW pumps	3.9	33
												(008K6.04) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF8 CCW) COMPONENT COOLING WATER SYSTEM (CFR: 41.7 / 45.7): CCW pumps	3.9	34
010 (SF3 PZR PCS) Pressurizer Pressure Control		X										(010K2.02) Knowledge of electrical power supplies to the following (CFR: 41.7): (SF3 PZR PCS) PRESSURIZER PRESSURE CONTROL SYSTEM PZR pressure controller	3.1	35
012 (SF7 RPS) Reactor Protection											X	(012) (SF7 RPS) REACTOR PROTECTION SYSTEM (G2.4.35) EMERGENCY PROCEDURES/PLAN: Knowledge of nonlicensed operator responsibilities during an emergency (CFR: 41.10 / 43.1 / 43.5 / 45.13)	3.8	36
											X	(012) (SF7 RPS) REACTOR PROTECTION SYSTEM (G2.1.6) CONDUCT OF OPERATIONS: Ability to manage the control room crew during plant transients (SRO Only) (CFR: 43.5 / 45.12 / 45.13)	4.8	88

013 (SF2 ESFAS) Engineered Safety Features Actuation						X			X			(013A3.12) Ability to monitor automatic features of the (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM, including (CFR: 41.7 / 45.7): ESFAS permissives (013K6.10) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF2 ESFAS) ENGINEERED SAFETY FEATURES ACTUATION SYSTEM (CFR: 41.7 / 45.7): Feedline break	3.9 4.0	37 38
022 (SF5 CCS) Containment Cooling							X					(022A1.02) Ability to predict and/or monitor changes in parameters associated with operation of the (SF5 CCS) CONTAINMENT COOLING SYSTEM, including (CFR: 41.5 / 45.5): Containment pressure	3.9	39
025 (SF5 ICE) Ice Condenser													
026 (SF5 CSS) Containment Spray		X						X				(026A2.09) Ability to (a) predict the impacts of the following on the (SF5 CSS) CONTAINMENT SPRAY SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 45.6): Radiation hazard potential of BWST/RWST (026K2.01) Knowledge of electrical power supplies to the following (CFR 41.7): (SF5 CSS) CONTAINMENT SPRAY SYSTEM Containment spray pumps	2.8 3.9	40 41
039 (SF4S MSS) Main and Reheat Steam									X			(039A3.01) Ability to monitor automatic features of the (SF4S MSS) MAIN AND REHEAT STEAM SYSTEM, including (CFR: 41.7 / 45.7): Moisture separator reheater steam supply	2.8	42
053 (SF1; SF4P ICS*) Integrated Control							X					(053A1.09) Ability to predict and/or monitor changes in parameters associated with operation of the (SF1 ICS) INTEGRATED CONTROL SYSTEM (BW), including (CFR: 41.5 / 45.5): RCS flow (RCP status)	3.6	43
059 (SF4S MFW) Main Feedwater	X											(059K1.13) Knowledge of the physical connections and/or cause and effect relationships between the (SF4S MFW) MAIN FEEDWATER SYSTEM and the following systems (CFR: 41.2 to 41.9 / 45.7 to 45.8): S/GB system	2.9	44
061 (SF4S AFW) Auxiliary/Emergency Feedwater							X			X		(061A1.02) Ability to predict and/or monitor changes in parameters associated with operation of the (SF4S AFW) AUXILIARY/EMERGENCY FEEDWATER SYSTEM, including (CFR: 41.5 / 45.5): S/G pressure (061A4.03) Ability to manually operate and/or monitor the (SF4S AFW) AUXILIARY/EMERGENCY FEEDWATER SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): AFW pump turbines	3.8 4.1	45 46
062 (SF6 ED AC) AC Electrical Distribution						X						(062K6.02) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF6 ED AC) AC ELECTRICAL DISTRIBUTION SYSTEM (CFR: 41.7 / 45.7): Breakers. relays, and disconnects	3.4	47
063 (SF6 ED DC) DC Electrical Distribution								X				(063A2.04) Ability to (a) predict the impacts of the following on the (SF6 ED DC) DC ELECTRICAL DISTRIBUTION SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 45.6): Battery malfunctions	3.9	48
064 (SF6 EDG) Emergency Diesel Generator				X							X	(064K4.01) Knowledge of (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Trips while loading the EDG (frequency, voltage, and speed) (064) (SF6 EDG) EMERGENCY DIESEL GENERATOR SYSTEM (G2.2.45) EQUIPMENT CONTROL Ability to determine and/or interpret TS with action statements of greater than 1 hour (SRO Only) (CFR: 43.2 / 43.5 / 45.3)	4.0 4.7	49 89

073 (SF7 PRM) Process Radiation Monitoring										X		(073A4.04) Ability to manually operate and/or monitor the (SF7 PRM) PROCESS RADIATION MONITORING SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): Alarm and/or interlock setpoint checks and adjustments	3.2	50
076 (SF4S SW) Service Water			X									(076K3.04) Knowledge of the effect that a loss or malfunction of the (SF4S SW) SERVICE WATER SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.4): Turbine building CCW (TPCW)	2.7	51
078 (SF8 IAS) Instrument Air									X	X		(078A3.03) Ability to monitor automatic features of the (SF8 IAS) INSTRUMENT AIR SYSTEM, including (CFR: 41.7 / 45.7): Air compressor loading/unloading (078A4.03) Ability to manually operate and/or monitor the (SF8 IAS) INSTRUMENT AIR SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): Isolation/restoration of instrument air to isolated components/systems	2.9 3.2	52 53
103 (SF5 CNT) Containment			X					X				(103K3.04) Knowledge of the effect that a loss or malfunction of the (SF5 CNT) CONTAINMENT SYSTEM will have on the following systems or system parameters (CFR: 41.7 / 45.4): Shield building vent system (103A2.04) Ability to (a) predict the impacts of the following on the (SF5 CNT) CONTAINMENT SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those operations (CFR: 41.5 / 43.5 / 45.6) Conditions requiring containment evacuation (including recognition of the alarm)	3.0 3.4	54 90
K/A Category Point Totals:	2	3	3	2	1	3	3	5	3	3	5	Group Point Total:		28/5

Form 4.1-PWR	PWR Examination Outline Plant Systems—Tier 2/Group 2 (RO/SRO)											Page 5		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
001 (SF1 CRDS) Control Rod Drive														
002 (SF2; SF4P RCS) Reactor Coolant										X		(002A4.03) Ability to manually operate and/or monitor the (SF2; SF4P RCS) REACTOR COOLANT SYSTEM in the control room (CFR: 41.7 / 45.5 to 45.8): Indications and controls necessary to recognize and correct saturation conditions	4	55
011 (SF2 PZR LCS) Pressurizer Level Control														
014 (SF1 RPI) Rod Position Indication		X										(014K2.04) Knowledge of electrical power supplies to the following (CFR 41.7): (SF1 RPIS) ROD POSITION INDICATION SYSTEM: Rod position main control room display panel	3.0	56
015 (SF7 NI) Nuclear Instrumentation											X	(015) (SF7 NI) NUCLEAR INSTRUMENTATION SYSTEM (G2.2.2) EQUIPMENT CONTROL: Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels (CFR: 41.6 / 41.7 / 45.2)	4.6	57
016 (SF7 NNI) Nonnuclear Instrumentation							X					(016A1.01) Ability to predict and/or monitor changes in parameters associated with operation of the (SF7 NNI) NONNUCLEAR INSTRUMENTATION SYSTEM, including (CFR: 41.5 / 45.5): Lights and alarms	3.2	58
017 (SF7 ITM) In-Core Temperature Monitor														
027 (SF5 CIRS) Containment Iodine Removal														
028 (SF5 HRPS) Hydrogen Recombiner and Purge Control														
029 (SF8 CPS) Containment Purge														
033 (SF8 SFPCS) Spent Fuel Pool Cooling					X							(033K5.06) Knowledge of the operational implications or cause and effect relationships of the following concepts as they apply to the (SF8 SFPCS) SPENT FUEL POOL COOLING SYSTEM (CFR: 41.5 / 45.3): Shielding (water level)	3.7	59
034 (SF8 FHS) Fuel Handling Equipment						X						(034K6.02) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the Fuel Handling Equipment System: RMS (CFR: 41.2 to 41.9 / 45.7 to 45.8): RCS	3.4	60
035 (SF 4P SG) Steam Generator											X	(035) (SF4P SG) STEAM GENERATOR SYSTEM (G2.1.45) CONDUCT OF OPERATIONS: Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)	4.3	91
041 (SF4S SDS) Steam Dump/Turbine Bypass Control	X											(041K1.09) Knowledge of the physical connections and/or cause and effect relationships between the (SF4S SDS) STEAM DUMP/TURBINE BYPASS CONTROL SYSTEM and the following systems (CFR: 41.2 to 41.9 / 45.7 to 45.8): MT/G system	3	61
045 (SF 4S MT/G) Main Turbine Generator											X	(045) (SF4S MTG) MAIN TURBINE GENERATOR SYSTEM (G2.2.12) EQUIPMENT CONTROL: Knowledge of surveillance procedures (CFR: 41.10 / 43.2 / 45.13)	4.1	92
050 (SF 9 CRV*) Control Room Ventilation						X						(050K6.03) Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SF9 CRV) CONTROL ROOM VENTILATION (CFR: 41.7 / 45.7): Plant pneumatic system	2.7	62

055 (SF4S CARS) Condenser Air Removal				X								(055K4.01) Knowledge of (SF4S CARS) CONDENSER AIR REMOVAL SYSTEM design features and/or interlocks that provide for the following (CFR: 41.7): Draw main condenser vacuum	3.3	63
056 (SF4S CDS) Condensate														
068 (SF9 LRS) Liquid Radwaste								X				(068A2.04) Ability to (a) predict the impacts of the following on the (SF9 LRS) LIQUID RADWASTE SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations (CFR: 41.5 / 43.5 / 45.6): Failure of automatic isolation	3.8	93
071 (SF9 WGS) Waste Gas Disposal														
072 (SF7 ARM) Area Radiation Monitoring														
075 (SF8 CW) Circulating Water														
079 (SF8 SAS**) Station Air														
086 (SF8 FP) Fire Protection														
050 (SF 9 CRV*) Control Room Ventilation														
K/A Category Point Totals:	1	1	0	1	1	2	1	1	0	1	3	Group Point Total:		9/3

Form 4.1-COMMON Common Examination Outline

Facility: Davis-Besse		Date of Exam: 01/08/2024				
Generic Knowledge and Abilities—Tier 3 (RO/SRO)						
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.17	(G2.1.17) CONDUCT OF OPERATIONS: Ability to make accurate, clear, and concise verbal reports (CFR: 41.10 / 45.12 / 45.13)	3.9	64		
	2.1.15	(G2.1.15) CONDUCT OF OPERATIONS: Knowledge of administrative requirements for temporary management direction, such as standing orders, night orders, or operations memoranda. (CFR: 41.10 / 45.12)	2.7	65		
	2.1.36	Knowledge of procedures and limitations involved in core alterations (CFR: 41.10 / 43.6 / 45.7)			4.1	94
	2.1.39	(G2.1.39) CONDUCT OF OPERATIONS: Knowledge of conservative decision-making practices (CFR: 41.10 / 43.5 / 45.12)			4.3	95
	Subtotal		N/A	2	N/A	2
2. Equipment Control	2.2.6	(G2.2.6) EQUIPMENT CONTROL: Knowledge of the process for making changes to procedures (CFR: 41.10 / 43.3 / 45.13)	3.0	66		
	2.2.43	(G2.2.43) EQUIPMENT CONTROL: Knowledge of the process used to track inoperable alarms (CFR: 41.10 / 43.5 / 45.13)	3.0	67		
	2.2.23	(G2.2.23) EQUIPMENT CONTROL: Ability to track TS limiting conditions for operation (CFR: 41.10 / 43.2 / 45.13)			4.6	96
	2.2.25	(G2.2.25) EQUIPMENT CONTROL: Knowledge of the bases in TS for limiting conditions for operation and safety limits (SRO Only) (CFR: 43.2)			4.2	97
	Subtotal		N/A	2	N/A	2
3. Radiation Control	G2.3.5	(G2.3.5) RADIATION CONTROL: Ability to use RMSs, such as fixed radiation monitors and alarms or personnel monitoring equipment (CFR: 41.11 / 41.12 / 43.4 / 45.9)	2.9	68		
	G2.3.6	(G2.3.6) RADIATION CONTROL: Ability to approve liquid or gaseous release permits (CFR: 41.13 / 43.4 / 45.10)			3.8	98
	Subtotal		N/A	1	N/A	1
4. Emergency Procedures/ Plan	2.4.26	(G2.4.26) EMERGENCY PROCEDURES/PLAN: Knowledge of facility protection requirements, including fire brigade and portable firefighting equipment usage (CFR: 41.10 / 43.5 / 45.12)	3.1	69		
	2.4.5	(G2.4.5) EMERGENCY PROCEDURES/PLAN: Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions (CFR: 41.10 / 43.5 / 45.13)			4.3	99
	2.4.40	(G2.4.40) EMERGENCY PROCEDURES/PLAN: Knowledge of SRO responsibilities in emergency plan implementing procedures (SRO Only) (CFR: 43.5 / 45.11)			4.5	100
	Subtotal		N/A	1	N/A	2
Tier 3 Point Total				6		7

Theory—Tier 4 (RO)				
Category	K/A #	Topic	RO	
			IR	#
Reactor Theory	192006	(192006K1.13) FISSION PRODUCT POISONS (CFR: 41.1): Plot the curve and explain the reasoning for the reactivity insertion by xenon-135 versus time for the following: -- reactor shutdown	3.0	70
	192007	(192007K1.05) FUEL DEPLETION AND BURNABLE POISONS (CFR: 41.1): Describe the effects of boration/dilution on reactivity during forced-flow and natural circulation conditions	3.2	71
	192008	(192008K1.03) REACTOR OPERATIONAL PHYSICS (CFR: 41.1): (STARTUP AND APPROACH TO CRITICALITY) Describe count rate and instrument response that should be observed for rod withdrawal during the approach to criticality	4.0	72
	Subtotal		N/A	3
Thermodynamics	193003	(193003K1.08) STEAM (CFR 41.14): Define the following term: Saturated Liquid	2.8	73
	193004	(193004K1.15) THERMODYNAMIC PROCESS (CFR: 41.14): (THROTTLING AND THE THROTTLING PROCESS) Determine the exit conditions for a throttling process based on the use of steam and/or water	2.8	74
	193010	(193010K1.06) BRITTLE FRACTURE AND VESSEL THERMAL STRESS (CFR: 41.14): Define PTS	3.8	75
	Subtotal		N/A	3
Tier 4 Point Total				**6**