

Facility: Davis-Besse RO

Date of Exam Weeks of 12/5 & 12/12 2011

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			6		
	2	2	2	1				2	1			1	9			4		
	Tier Totals	5	5	4				5	4			4	27			10		
2. Plant Systems	1	3	2	3	3	2	2	3	3	2	2	3	28			5		
	2	1	1	1	1	1	1	1	0	1	1	1	10			3		
	Tier Totals	4	3	4	4	3	3	4	3	3	3	4	38			8		
3. Generic Knowledge and Abilities Category					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 outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/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 shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/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' 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.
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.

ES-401		PWR Examination Outline						Form ES-401-2	
Davis-Besse 12/2011		Emergency and Abnormal Plant Evolutions - Tier 1/Group 1(RO)							
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000007 Rx Trip Stabilization-Recovery <b>Question 1</b>			X				EK3.01 Knowledge of the reasons for the following as the apply to a reactor trip: Actions contained in EOP for reactor trip (CFR 41.5 / 41.10 / 45.6 / 45.13)	4.0	1
000008 Pressurizer (PZR) Vapor Space Accident <b>Question 2</b>		X					AK2.01 Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Valves (CFR 41.7 / 45.7)	2.7*	1
000009 Small Break LOCA <b>Question 3</b>						X	2.4.11 Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)	4.0	1
000011 Large Break LOCA <b>Question 4</b>		X					EK2.02 Knowledge of the interrelations between the Large Break LOCA and the following: Pumps (CFR 41.7 / 45.7)	2.6*	1
000015/000017 Reactor Coolant Pump (RCP) Malfunctions <b>Question 5</b>					X		AA2.01 Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Cause of RCP failure (CFR 43.5 / 45.13)	3.0	1
000025 Loss of Residual Heat Removal System (RHRS) <b>Question 6</b>						X	2.4.3 Ability to identify post-accident instrumentation. (CFR: 41.6 / 45.4)	3.7	1
000026 Loss of Component Cooling Water (CCW) <b>Question 7</b>						X	2.1.32 Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)	3.8	1
000027 Pressurizer Pressure Control System (PZR PCS) Malfunction <b>Question 8</b>		X					AK2.03 Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners (CFR 41.7 / 45.7)	2.6	1
000029 Anticipated Transient Without Scram (ATWS) <b>Question 9</b>	X						EK1.03 Knowledge of the operational implications of the following concepts as they apply to the ATWS: Effects of boron on reactivity (CFR 41.8 / 41.10 / 45.3)	3.6	1
000040 Steam Line Rupture – Excessive Heat Transfer <b>Question 10</b>	X						AK1.05 Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: Reactivity effects of cooldown (CFR 41.8 / 41.10 / 45.3)	4.1	1
000054 Loss of Main Feedwater (MFW) <b>Question 11</b>	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G (CFR 41.8 / 41.10 / 45.3)	3.6	1
000055 Loss of Offsite and Onsite Power (Station Blackout) <b>Question 12</b>					X		EA2.01 Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system (CFR 43.5 / 45.13)	3.4	1
000056 Loss of Offsite Power <b>Question 13</b>				X			AA1.04 Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Adjustment of speed of ED/G to maintain frequency and voltage levels (CFR 41.7 / 45.5 / 45.6)	3.2	1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000057 Loss of Vital AC Electrical Instrument Bus <b>Question 14</b>				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
000058 Loss of DC Power <b>Question 15</b>				X			AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Vital and battery bus components (CFR 41.7 / 45.5 / 45.6)	3.1	1
000062 Loss of Nuclear Service Water <b>Question 16</b>			X				AK3.04 Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: Effect on the nuclear service water discharge flow header of a loss of CCW (CFR 41.4, 41.8 / 45.7 )	3.5	1
000065 Loss of Instrument Air <b>Question 17</b>					X		AA2.08 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Failure modes of air-operated equipment (CFR: 43.5 / 45.13)	2.9*	1
BW/E04 Inadequate Heat Transfer - Loss Of Secondary Heat Sink <b>Question 18</b>			X				EK3.3 Knowledge of the reasons for the following responses as they apply to the (Inadequate Heat Transfer) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. (CFR: 41.5 / 41.10, 45.6, 45.13)	4.2	1
K/A Category Point Totals:	3	3	3	3	3	3	Group Point Total:		18

ES-401	PWR Examination Outline						Form ES-401-2		
Davis-Besse 12/2011	Emergency and Abnormal Plant Evolutions - Tier 1/Group 2(RO)								
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000001 Continuous Rod Withdrawal <b>Question 19</b>	X						AK1.14 Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: Interaction of ICS control stations as well as purpose, function, and modes of operation of ICS (CFR 41.8 / 41.10 / 45.3)	3.4*	1
000005 Inoperable/Stuck Control Rod <b>Question 20</b>		X					AK2.01 Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: Controllers and positioners (CFR 41.7 / 45.7)	2.5	1
000024 Emergency Boration <b>Question 21</b>						X	2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12)	3.9	1
000028 Pressurizer (PZR) Level Control Malfunction <b>Question 22</b>				X			AA1.07 Ability to operate and / or monitor the following as they apply to the Pressurizer Level Control Malfunctions: Charging pumps maintenance of PZR level (including manual backup) (CFR 41.7 / 45.5 / 45.6)	3.3	1
000033 Loss of Intermediate Range Nuclear Instrumentation <b>Question 23</b>	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Loss of Intermediate Range Nuclear Instrumentation: Effects of voltage changes on performance (CFR 41.8 / 41.10 / 45.3)	2.7	1
000059 Accidental Liquid Radwaste Release <b>Question 24</b>					X		AA2.06 Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: That the flow rate of the liquid being released is less than or equal to that specified on the release permit (CFR: 43.5 / 45.13)	3.5*	1
000069 Loss of Containment Integrity <b>Question 25</b>				X			AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of Containment Integrity: Fluid systems penetrating containment (CFR 41.7 / 45.5 / 45.6)	2.8	1
BW/A03 Loss of NNI-Y <b>Question 26</b>			X				AK3.4 Knowledge of the reasons for the following responses as they apply to the (Loss of NNI-Y): 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)	3.5	1
BW/E14 EOP Enclosures <b>Question 27</b>		X					EK2.2 Knowledge of the interrelations between the (EOP enclosures) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility. (CFR: 41.7 / 45.7)	3.8	1
K/A Category Point Totals:	2	2	1	2	1	1		Group Point Total:	9

ES-401		PWR Examination Outline											Form ES-401-2	
Davis-Besse 12/2011		Plant Systems - Tier 2/Group 1(RO)												
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) <b>Question 28</b>											X	A3.04 Ability to monitor automatic operation of the RCPS, including: RCS flow (CFR: 41.7 / 45.5)	3.6	1
003 Reactor Coolant Pump System (RCPS) <b>Question 29</b>			X									K3.05 Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: ICS (CFR: 41.7 / 45.6)	3.6*	1
004 Chemical and Volume Control System <b>Question 30</b>						X						K6.13 Knowledge of the effect of a loss or malfunction on the following CVCS components: Purpose and function of the boration/dilution batch controller (CFR: 41.7 / 45.7)	3.1	1
005 Residual Heat Removal System (RHRS) <b>Question 31</b>				X								K4.02 Knowledge of RHRS design feature(s) and/or interlock(s) which provide for the following: Modes of operation (CFR: 41.7)	3.2	1
006 Emergency Core Cooling System (ECCS) <b>Question 32</b>	X											K1.13 Knowledge of the physical connections and/or cause effect relationships between the ECCS and the following systems: CSS (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.3*	1
007 Pressurizer Relief Tank/Quench Tank System (PRTS) <b>Question 33</b>					X							K5.02 Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR (CFR: 41.5 / 45.7)	3.1	1
008 Component Cooling Water System (CCWS) <b>Question 34</b>										X		A4.10 Ability to manually operate and/or monitor in the control room: Conditions that require the operation of two CCW coolers (CFR: 41.7 / 45.5)	3.1*	1
008 Component Cooling Water System (CCWS) <b>Question 35</b>		X										K2.02 Knowledge of bus power supplies to the following: CCW pump, including emergency backup (CFR: 41.7)	3.0*	1
010 Pressurizer Pressure Control System (PZR PCS) <b>Question 36</b>											X	2.4.11 Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)	4.0	1
010 Pressurizer Pressure Control System (PZR PCS) <b>Question 37</b>			X									K3.03 Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: ESFAS (CFR: 41.7 / 45.6)	4.0	1
012 Reactor Protection System (RPS) <b>Question 38</b>											X	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)	4.2	1
012 Reactor Protection System (RPS) <b>Question 39</b>				X								K4.04 Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following: Redundancy (CFR: 41.7)	3.1	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
013 Engineered Safety Features Actuation System (ESFAS) <b>Question 40</b>						X						K6.01 Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: Sensors and detectors (CFR: 41.7 / 45.5 to 45.8)	2.7*	1
022 Containment Cooling System (CCS) <b>Question 41</b>			X									K3.02 Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment instrumentation readings (CFR: 41.7 / 45.6)	3.0	1
064 Emergency Diesel Generator (ED/G) System <b>Question 42</b>											X	2.1.20 Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)	4.6	1
006 Emergency Core Cooling System (ECCS) <b>Question 43</b>				X								K4.26 Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Parallel redundant systems (CFR: 41.7)	3.3	1
026 Containment Spray System (CSS) <b>Question 44</b>		X										K2.01 Knowledge of bus power supplies to the following: Containment spray pumps (CFR: 41.7)	3.4*	1
039 Main and Reheat Steam System (MRSS) <b>Question 45</b>								X				A2.05 Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Increasing steam demand, its relationship to increases in reactor power (CFR: 41.5 / 43.5 / 45.3 / 45.13)	3.3	1
059 Main Feedwater (MFW) System <b>Question 46</b>									X			A3.07 Ability to monitor automatic operation of the MFW, including: ICS (CFR: 41.7 / 45.5)	3.4*	1
059 Main Feedwater (MFW) System <b>Question 47</b>										X		A4.10 Ability to manually operate and monitor in the control room: ICS (CFR: 41.7 / 45.5 to 45.8)	3.9*	1
061 Auxiliary / Emergency Feedwater (AFW) System <b>Question 48</b>					X							K5.03 Knowledge of the operational implications of the following concepts as they apply to the AFW: Pump head effects when control valve is shut (CFR: 41.5 / 45.7)	2.6	1
062 AC Electrical Distribution System <b>Question 49</b>							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
063 DC Electrical Distribution System <b>Question 50</b>							X					A1.01 Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate (CFR: 41.5 / 45.5)	2.5	1

ES-401		PWR Examination Outline										Form ES-401-2		
Davis-Besse 12/2011		Plant Systems - Tier 2/Group 1(RO) Continued												
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
064 Emergency Diesel Generator (ED/G) System <b>Question 51</b>								X				A2.14 Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects (verification) of stopping ED/G under load on isolated bus (CFR: 41.5 / 43.5 / 45.3 / 45.13)	2.7	1
073 Process Radiation Monitoring (PRM) System <b>Question 52</b>	X											K1.01 Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems: Those systems served by PRMs (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.6	1
076 Service Water System (SWS) <b>Question 53</b>							X					A1.02 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: Reactor and turbine building closed cooling water temperatures (CFR: 41.5 / 45.5)	2.6 *	1
078 Instrument Air System (IAS) <b>Question 54</b>	X											K1.02 Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Service air (CFR: 41.2 to 41.9 / 45.7 to 45.8)	2.7 *	1
103 Containment System <b>Question 55</b>								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:	3	2	3	3	2	2	3	3	2	2	3	Group Point Total:	28	

ES-401		PWR Examination Outline										Form ES-401-2		
Davis-Besse 12/2011		Plant Systems - Tier 2/Group 2(RO)												
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 System <b>Question 56</b>							X					A1.07 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: RCS average temperature indications (T-ave.) (CFR: 41.5/45.5)	3.7	1
017 In-Core Temperature Monitor (ITM) System <b>Question 57</b>											X	2.1.19 Ability to use plant computers to evaluate system or component status. (CFR: 41.10 / 45.12)	3.9	1
027 Containment Iodine Removal System (CIRS) <b>Question 58</b>		X										K2.01 Knowledge of bus power supplies to the following: Fans (CFR: 41.7)	3.1*	1
028 Hydrogen Recombiner and Purge Control System (HRPS) <b>Question 59</b>										X		A4.02 Ability to manually operate and/or monitor in the control room: Location and interpretation of containment pressure indications (CFR: 41.7 / 45.5 to 45.8)	3.7*	1
029 Containment Purge System (CPS) <b>Question 60</b>			X									K3.01 Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters (CFR: 41.7 / 45.6)	2.9	1
033 Spent Fuel Pool Cooling System (SFPCS) <b>Question 61</b>									X			A3.01 Ability to monitor automatic operation of the Spent Fuel Pool Cooling System including: Temperature control valves (CFR: 41.7 / 45.5)	2.5*	1
034 Fuel Handling Equipment System (FHES) <b>Question 62</b>						X						K6.02 Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System : Radiation monitoring systems (CFR: 41.7 / 45.7)	2.6	1
071 Waste Gas Disposal System (WGDS) <b>Question 63</b>					X							K5.04 Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability (CFR: 41.5 / 45.7)	2.5	1
075 Circulating Water System <b>Question 64</b>				X								K4.01 Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following: Heat sink (CFR: 41.7)	2.5	1
086 Fire Protection System (FPS) <b>Question 65</b>	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



Facility: Davis-Besse RODate of Exam Weeks of 12/5 & 12/12 2011

Category	K/A#	Topic	RO		SRO Only	
			IR	Points	IR	Points
1. Conduct of Operations	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12) <b>Question 66</b>	3.9	1		
	2.1.26	Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen). (CFR: 41.10 / 45.12) <b>Question 67</b>	3.4	1		
	Subtotal			<b>2</b>		
2. Equipment Control	2.2.6	Knowledge of the process for making changes to procedures. (CFR: 41.10 / 43.3 / 45.13) <b>Question 68</b>	3.0	1		
	2.2.22	Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2) <b>Question 69</b>	4.0	1		
	2.2.41	Ability to obtain and interpret station electrical and mechanical drawings. (CFR: 41.10 / 45.12 / 45.13) <b>Question 70</b>	3.5	1		
	Subtotal			<b>3</b>		
3. Radiation Control	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10) <b>Question 71</b>	3.5	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) <b>Question 72</b>	3.2	1		
	Subtotal			<b>2</b>		
4. Emergency Procedures/ Plan	2.4.20	Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13) <b>Question 73</b>	3.8	1		
	2.4.37	Knowledge of the lines of authority during implementation of the emergency plan. (CFR: 41.10 / 45.13) <b>Question 74</b>	3.0	1		
	2.4.46	Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12) <b>Question 75</b>	4.2	1		
	Subtotal			<b>3</b>		
<b>Tier 3 Point Total</b>				<b>10</b>		<b>7</b>

Facility: **Davis-Besse RO**

Date of Exam **12/5 thru 12/15 2011**

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	<b>18</b>			<b>6</b>	
	2	2	2	1				2	1			1	<b>9</b>			<b>4</b>	
	Tier Totals	<b>5</b>	<b>5</b>	<b>4</b>				<b>5</b>	<b>4</b>			<b>4</b>	<b>27</b>			<b>10</b>	
2. Plant Systems	1	3	2	3	3	2	2	3	3	2	2	3	<b>28</b>			<b>5</b>	
	2	2	0	1	1	1	1	1	1	0	1	1	<b>10</b>			<b>3</b>	
	Tier Totals	<b>5</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>38</b>			<b>8</b>	
3. Generic Knowledge and Abilities Category						1	2	3	4	<b>10</b>			1	2	3	4	<b>7</b>
						<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>								

Note:

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3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/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 shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/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' 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.
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.

ES-401		PWR Examination Outline						Form ES-401-2	
Davis-Besse 12/2011		Emergency and Abnormal Plant Evolutions - Tier 1/Group 1(RO)							
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000007 Rx Trip Stabilization-Recovery <b>Question 1</b>			X				EK3.01 Knowledge of the reasons for the following as the apply to a reactor trip: Actions contained in EOP for reactor trip (CFR 41.5 / 41.10 / 45.6 / 45.13)	4.0	1
000008 Pressurizer (PZR) Vapor Space Accident <b>Question 2</b>		X					AK2.01 Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Valves (CFR 41.7 / 45.7)	2.7*	1
000009 Small Break LOCA <b>Question 3</b>						X	2.4.11 Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)	4.0	1
000011 Large Break LOCA <b>Question 4</b>		X					EK2.02 Knowledge of the interrelations between the Large Break LOCA and the following: Pumps (CFR 41.7 / 45.7)	2.6*	1
000015/000017 Reactor Coolant Pump (RCP) Malfunctions <b>Question 5</b>					X		AA2.01 Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Cause of RCP failure (CFR 43.5 / 45.13)	3.0	1
000025 Loss of Residual Heat Removal System (RHRS) <b>Question 6</b>						X	2.4.3 Ability to identify post-accident instrumentation. (CFR: 41.6 / 45.4)	3.7	1
000026 Loss of Component Cooling Water (CCW) <b>Question 7</b>						X	2.1.32 Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)	3.8	1
000027 Pressurizer Pressure Control System (PZR PCS) Malfunction <b>Question 8</b>		X					AK2.03 Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners (CFR 41.7 / 45.7)	2.6	1
000029 Anticipated Transient Without Scram (ATWS) <b>Question 9</b>	X						EK1.03 Knowledge of the operational implications of the following concepts as they apply to the ATWS: Effects of boron on reactivity (CFR 41.8 / 41.10 / 45.3)	3.6	1
000040 Steam Line Rupture – Excessive Heat Transfer <b>Question 10</b>	X						AK1.05 Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: Reactivity effects of cooldown (CFR 41.8 / 41.10 / 45.3)	4.1	1
000054 Loss of Main Feedwater (MFW) <b>Question 11</b>	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G (CFR 41.8 / 41.10 / 45.3)	3.6	1
000055 Loss of Offsite and Onsite Power (Station Blackout) <b>Question 12</b>					X		EA2.01 Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system (CFR 43.5 / 45.13)	3.4	1
000056 Loss of Offsite Power <b>Question 13</b>				X			AA1.04 Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Adjustment of speed of ED/G to maintain frequency and voltage levels (CFR 41.7 / 45.5 / 45.6)	3.2	1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000057 Loss of Vital AC Electrical Instrument Bus <b>Question 14</b>				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
000058 Loss of DC Power <b>Question 15</b>				X			AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Vital and battery bus components (CFR 41.7 / 45.5 / 45.6)	3.1	1
000062 Loss of Nuclear Service Water <b>Question 16</b>			X				AK3.04 Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: Effect on the nuclear service water discharge flow header of a loss of CCW (CFR 41.4, 41.8 / 45.7 )	3.5	1
000065 Loss of Instrument Air <b>Question 17</b>					X		AA2.08 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Failure modes of air-operated equipment (CFR: 43.5 / 45.13)	2.9*	1
BW/E04 Inadequate Heat Transfer - Loss Of Secondary Heat Sink <b>Question 18</b>			X				EK3.3 Knowledge of the reasons for the following responses as they apply to the (Inadequate Heat Transfer) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. (CFR: 41.5 / 41.10, 45.6, 45.13)	4.2	1
K/A Category Point Totals:	3	3	3	3	3	3	Group Point Total:		18

ES-401	PWR Examination Outline						Form ES-401-2		
Davis-Besse 12/2011	Emergency and Abnormal Plant Evolutions - Tier 1/Group 2(RO)								
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	Points
000001 Continuous Rod Withdrawal <b>Question 19</b>	X						AK1.14 Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: Interaction of ICS control stations as well as purpose, function, and modes of operation of ICS (CFR 41.8 / 41.10 / 45.3)	3.4*	1
000005 Inoperable/Stuck Control Rod <b>Question 20</b>		X					AK2.01 Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: Controllers and positioners (CFR 41.7 / 45.7)	2.5	1
000024 Emergency Boration <b>Question 21</b>						X	2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12)	3.9	1
000028 Pressurizer (PZR) Level Control Malfunction <b>Question 22</b>				X			AA1.07 Ability to operate and / or monitor the following as they apply to the Pressurizer Level Control Malfunctions: Charging pumps maintenance of PZR level (including manual backup) (CFR 41.7 / 45.5 / 45.6)	3.3	1
000033 Loss of Intermediate Range Nuclear Instrumentation <b>Question 23</b>	X						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Loss of Intermediate Range Nuclear Instrumentation: Effects of voltage changes on performance (CFR 41.8 / 41.10 / 45.3)	2.7	1
000059 Accidental Liquid Radwaste Release <b>Question 24</b>					X		AA2.06 Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: That the flow rate of the liquid being released is less than or equal to that specified on the release permit (CFR: 43.5 / 45.13)	3.5*	1
000069 Loss of Containment Integrity <b>Question 25</b>				X			AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of Containment Integrity: Fluid systems penetrating containment (CFR 41.7 / 45.5 / 45.6)	2.8	1
BW/A03 Loss of NNI-Y <b>Question 26</b>			X				AK3.4 Knowledge of the reasons for the following responses as they apply to the (Loss of NNI-Y): 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)	3.5	1
BW/E14 EOP Enclosures <b>Question 27</b>		X					EK2.2 Knowledge of the interrelations between the (EOP enclosures) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility. (CFR: 41.7 / 45.7)	3.8	1
K/A Category Point Totals:	2	2	1	2	1	1		Group Point Total:	9

ES-401		PWR Examination Outline											Form ES-401-2	
Davis-Besse 12/2011		Plant Systems - Tier 2/Group 1(RO)												
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) <b>Question 28</b>										X		A3.04 Ability to monitor automatic operation of the RCPS, including: RCS flow (CFR: 41.7 / 45.5)	3.6	1
003 Reactor Coolant Pump System (RCPS) <b>Question 29</b>			X									K3.05 Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: ICS (CFR: 41.7 / 45.6)	3.6*	1
004 Chemical and Volume Control System <b>Question 30</b>						X						K6.13 Knowledge of the effect of a loss or malfunction on the following CVCS components: Purpose and function of the boration/dilution batch controller (CFR: 41.7 / 45.7)	3.1	1
005 Residual Heat Removal System (RHRS) <b>Question 31</b>				X								K4.02 Knowledge of RHRS design feature(s) and/or interlock(s) which provide for the following: Modes of operation (CFR: 41.7)	3.2	1
006 Emergency Core Cooling System (ECCS) <b>Question 32</b>	X											K1.13 Knowledge of the physical connections and/or cause effect relationships between the ECCS and the following systems: CSS (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.3*	1
007 Pressurizer Relief Tank/Quench Tank System (PRTS) <b>Question 33</b>					X							K5.02 Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR (CFR: 41.5 / 45.7)	3.1	1
008 Component Cooling Water System (CCWS) <b>Question 34</b>										X		A4.10 Ability to manually operate and/or monitor in the control room: Conditions that require the operation of two CCW coolers (CFR: 41.7 / 45.5)	3.1*	1
008 Component Cooling Water System (CCWS) <b>Question 35</b>		X										K2.02 Knowledge of bus power supplies to the following: CCW pump, including emergency backup (CFR: 41.7)	3.0*	1
010 Pressurizer Pressure Control System (PZR PCS) <b>Question 36</b>											X	2.4.11 Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)	4.0	1
010 Pressurizer Pressure Control System (PZR PCS) <b>Question 37</b>			X									K3.03 Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: ESFAS (CFR: 41.7 / 45.6)	4.0	1
012 Reactor Protection System (RPS) <b>Question 38</b>											X	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)	4.2	1
012 Reactor Protection System (RPS) <b>Question 39</b>				X								K4.04 Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following: Redundancy (CFR: 41.7)	3.1	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
013 Engineered Safety Features Actuation System (ESFAS) <b>Question 40</b>						X						K6.01 Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: Sensors and detectors (CFR: 41.7 / 45.5 to 45.8)	2.7*	1
022 Containment Cooling System (CCS) <b>Question 41</b>			X									K3.02 Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment instrumentation readings (CFR: 41.7 / 45.6)	3.0	1
064 Emergency Diesel Generator (ED/G) System <b>Question 42</b>											X	2.1.20 Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)	4.6	1
006 Emergency Core Cooling System (ECCS) <b>Question 43</b>				X								K4.26 Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Parallel redundant systems (CFR: 41.7)	3.3	1
026 Containment Spray System (CSS) <b>Question 44</b>		X										K2.01 Knowledge of bus power supplies to the following: Containment spray pumps (CFR: 41.7)	3.4*	1
039 Main and Reheat Steam System (MRSS) <b>Question 45</b>								X				A2.05 Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Increasing steam demand, its relationship to increases in reactor power (CFR: 41.5 / 43.5 / 45.3 / 45.13)	3.3	1
059 Main Feedwater (MFW) System <b>Question 46</b>									X			A3.07 Ability to monitor automatic operation of the MFW, including: ICS (CFR: 41.7 / 45.5)	3.4*	1
059 Main Feedwater (MFW) System <b>Question 47</b>										X		A4.10 Ability to manually operate and monitor in the control room: ICS (CFR: 41.7 / 45.5 to 45.8)	3.9*	1
061 Auxiliary / Emergency Feedwater (AFW) System <b>Question 48</b>					X							K5.03 Knowledge of the operational implications of the following concepts as they apply to the AFW: Pump head effects when control valve is shut (CFR: 41.5 / 45.7)	2.6	1
062 AC Electrical Distribution System <b>Question 49</b>							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
063 DC Electrical Distribution System <b>Question 50</b>							X					A1.01 Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate (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
064 Emergency Diesel Generator (ED/G) System <b>Question 51</b>								X				A2.14 Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects (verification) of stopping ED/G under load on isolated bus (CFR: 41.5 / 43.5 / 45.3 / 45.13)	2.7	1
073 Process Radiation Monitoring (PRM) System <b>Question 52</b>	X											K1.01 Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems: Those systems served by PRMs (CFR: 41.2 to 41.9 / 45.7 to 45.8)	3.6	1
076 Service Water System (SWS) <b>Question 53</b>							X					A1.02 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: Reactor and turbine building closed cooling water temperatures (CFR: 41.5 / 45.5)	2.6 *	1
078 Instrument Air System (IAS) <b>Question 54</b>	X											K1.02 Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Service air (CFR: 41.2 to 41.9 / 45.7 to 45.8)	2.7 *	1
103 Containment System <b>Question 55</b>								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:	3	2	3	3	2	2	3	3	2	2	3	Group Point Total:		28



ES-401		PWR Examination Outline											Form ES-401-2	
Davis-Besse 12/2011		Plant Systems - Tier 2/Group 2(RO)												
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 System <b>Question 56</b>							X					A1.07 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: RCS average temperature indications (T-ave.) (CFR: 41.5/45.5)	3.7	1
017 In-Core Temperature Monitor (ITM) System <b>Question 57</b>											X	2.1.19 Ability to use plant computers to evaluate system or component status. (CFR: 41.10 / 45.12)	3.9	1
016 Non-Nuclear Instrumentation System (NNIS) <b>Question 58</b>								X				A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of power supply ((CFR: 41.5 / 43.5 / 45.3 / 45.5)	2.9*	1
028 Hydrogen Recombiner and Purge Control System (HRPS) <b>Question 59</b>										X		A4.01 Ability to manually operate and/or monitor in the control room: HRPS controls (CFR: 41.7 / 45.5 to 45.8)	4.0*	1
029 Containment Purge System (CPS) <b>Question 60</b>			X									K3.01 Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters (CFR: 41.7 / 45.6)	2.9	1
033 Spent Fuel Pool Cooling System (SFPCS) <b>Question 61</b>	X											K1.02 Knowledge of the physical connections and/or Knowledge of the physical connections and/or cause/effect relationships between the Spent Fuel Pool Cooling System and the following systems: HRS (CFR: 41.2 to 41.9 / 45.7 to 45.8)	2.5	1
034 Fuel Handling Equipment System (FHES) <b>Question 62</b>						X						K6.02 Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System : Radiation monitoring systems (CFR: 41.7 / 45.7)	2.6	1
071 Waste Gas Disposal System (WGDS) <b>Question 63</b>					X							K5.04 Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability (CFR: 41.5 / 45.7)	2.5	1
075 Circulating Water System <b>Question 64</b>				X								K4.01 Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following: Heat sink (CFR: 41.7)	2.5	1
086 Fire Protection System (FPS) <b>Question 65</b>	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:	2	0	1	1	1	1	1	1	0	1	1	Group Point Total:		10

Facility: **Davis-Besse RO**Date of Exam **12/5 thru 12/15 2011**

Category	K/A#	Topic	RO		SRO Only	
			IR	Points	IR	Points
1. Conduct of Operations	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12) <b>Question 66</b>	3.9	1		
	2.1.26	Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen). (CFR: 41.10 / 45.12) <b>Question 67</b>	3.4	1		
	Subtotal			<b>2</b>		
2. Equipment Control	2.2.6	Knowledge of the process for making changes to procedures. (CFR: 41.10 / 43.3 / 45.13) <b>Question 68</b>	3.0	1		
	2.2.22	Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2) <b>Question 69</b>	4.0	1		
	2.2.41	Ability to obtain and interpret station electrical and mechanical drawings. (CFR: 41.10 / 45.12 / 45.13) <b>Question 70</b>	3.5	1		
	Subtotal			<b>3</b>		
3. Radiation Control	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10) <b>Question 71</b>	3.5	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) <b>Question 72</b>	3.2	1		
	Subtotal			<b>2</b>		
4. Emergency Procedures/ Plan	2.4.20	Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13) <b>Question 73</b>	3.8	1		
	2.4.37	Knowledge of the lines of authority during implementation of the emergency plan. (CFR: 41.10 / 45.13) <b>Question 74</b>	3.0	1		
	2.4.46	Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12) <b>Question 75</b>	4.2	1		
	Subtotal			<b>3</b>		
Tier 3 Point Total				<b>10</b>		<b>7</b>