

# **POINT BEACH**

**OCTOBER 2000**

**FINAL, AS-GIVEN  
WRITTEN  
EXAMINATION**

Facility: <b>Point Beach Nuclear Plant</b>		Date of Exam: <b>16 Oct 2000</b> Exam Level: <b>SRO</b>											
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	4	1	5				3	7			4	24
	2	2	1	3				3	5			2	16
	3	0	1	0				0	1			1	3
	Tier Totals	6	3	8				6	13			7	43
2. Plant Systems	1	0	2	1	1	1	1	2	5	1	2	3	19
	2	3	0	1	2	1	1	1	3	1	2	2	17
	3	1	0	0	2	0	0	0	1	0	0	0	4
	Tier Totals	4	2	2	5	2	2	3	9	2	4	5	40
3. Generic Knowledge and Abilities							Cat 1	Cat 2	Cat 3	Cat 4	17		
							4	3	5	5			
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. Actual point totals must match those specified in the table.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1							Form ES-401-3	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1	X						<u>001AK1.05</u> Operational implications of turbine-reactor power mismatch on rod control. (RO)	3.8	1
000003 Dropped Control Rod / 1				X			<u>003AA1.03</u> Operate/monitor rod control switches as applied to dropped control rod. (RO)	3.3	1
000005 Inoperable/Stuck Control Rod / 1	X						<u>005AK1.02</u> Knowledge of operational implications of flux tilt as applied to a Inoperable/Stuck Control Rod. (RO)	3.9	1
000011 Large Break LOCA / 3						X	<u>011EA2.10</u> Determine/interpret verification of adequate core cooling.	4.7	1
W/E04 LOCA Outside Containment / 3	X						<u>W/E04EK1.1</u> Operational implications of components, capacity, function of emergency systems. (RO)	3.9	1
W/E01 & E02 Rediagnosis & SI Termination / 3				X			<u>W/E02EA1.3</u> Operate/monitor desired operating results during abnormal and emergency situations.. (RO)	4.0	1
000015/17 RCP Malfunctions / 4						X	<u>2.2.22</u> Knowledge of limiting conditions for operations and safety limits. (RO)	4.1	1
BW/E09; CE/A13; W/E09 & E10 Natural Circ. / 4					X		<u>W/E09EA2.2</u> Ability to determine/interpret adherence to appropriate procedures and operation within the limitations in the facility license and amendments. (RO)	3.9	1
000024 Emergency Boration / 1					X		<u>024AA2.05</u> Determine/interpret amount of boron to add to achieve required SDM. (RO)	3.9	1
000026 Loss of Component Cooling Water / 8			X				<u>026AK3.04</u> Reason for responses as applied to the effect on the CCW flow header of a loss of CCW. (RO)	3.7	1
000029 Anticipated Transient w/o Scram / 1						X	<u>2.4.12</u> Knowledge of crew responsibilities during emergency operations. (RO)	3.9	1
000040 (BW/E05, CE/E05; W/E12) Steam Line Rupture – Excessive Heat Transfer / 4			X				<u>W/E12EK3.1</u> Reasons for responses as applied to uncontrolled steam generator depressurization associated with facility operating characteristics during transient conditions. (RO)	3.9	1
CE/A11; W/E08 RCS Overcooling – PTS / 4				X			<u>W/E08EA1.3</u> Operate/monitor desired operating results during abnormal and emergency situations. (RO)	4.0	1
000051 Loss of Condenser Vacuum / 4					X		<u>051AA2.02</u> Determine/interpret conditions requiring reactor and/or turbine trip. (RO)	4.1	1
000055 Station Blackout / 6			X				<u>055EK3.02</u> Knowledge of reasons for actions contained in EOP for loss of offsite and onsite power. (RO)	4.6	2
					X		<u>055EA2.02</u> Ability to determine/interpret RCS core cooling through natural circulation cooling to S/G cooling.	4.6	
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		<u>057AA2.19</u> Ability to determine/interpret plant automatic actions that will occur on a loss of vital ac electrical instrument bus (RO)	4.3	1
000059 Accidental Liquid RadWaste Release / 9			X				<u>059AK3.01</u> Reason for termination of radioactive liquid release. (RO)	3.9	1

ES-401

PWR SRO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 1  
(CONTINUED)

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000062 Loss of Nuclear Service Water / 4					X		<u>062AA2.02</u> Determine/interpret the cause of possible SWS loss.	3.6	1
000067 Plant Fire On-site / 9						X	<u>2.4.26</u> Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.	3.3	1
000068 (BW/A06) Control Room Evacuation / 8			X				<u>068AK3.12</u> Knowledge of sequence of actions for emergency evacuation of control room. (RO)	4.5	1
000069 (W/E14) Loss of CTMT Integrity / 5	X						<u>069AK1.01</u> Operational implications of the effects of pressure on leak rate as applied to loss of containment integrity. (RO)	3.1	1
000074 (W/E06&E07) Inadequate Core Cooling / 4		X					<u>074EK2.04</u> Knowledge of the interrelationships between the HPI pumps and inadequate core cooling. (RO)	4.1	1
BW/E03 Inadequate Subcooling Margin / 4							N/A	N/A	N/A
000076 High Reactor Coolant Activity / 9						X	<u>2.4.11</u> Knowledge of abnormal condition procedures.	3.6	1
BW/A02&A03 Loss of NNI-XY / 7							N/A	N/A	N/A
(RO) Question repeated from Reactor Operator Exam.									
K/A Category Totals:	4	1	5	3	7	4	Group Point Total:		24

ES-401		PWR SRO Examination Outline						Form ES-401-3		
Emergency and Abnormal Plant Evolutions – Tier 1/Group 2										
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points	
000007 (BW/E02&E10; CE/E02) Reactor Trip – Stabilization – Recovery / 1						X	<u>2.4.31</u> Knowledge of annunciators, alarms and indications, and use of response instructions. (RO)	3.4	1	
BW/A01 Plant Runback / 1							N/A	N/A	N/A	
BW/A04 Turbine Trip / 4							N/A	N/A	N/A	
000008 Pressurizer Vapor Space Accident / 3		X					<u>008AK2.02</u> Interrelations with sensors/detectors. (RO)	2.7	1	
000009 Small Break LOCA / 3	X						<u>009EK1.01</u> Operational implications of natural circulation and cooling, including reflux. (RO)	4.7	1	
BW/E08; W/E03 LOCA Cooldown – Depress. / 4							NOT SELECTED			
W/E11 Loss of Emergency Coolant Recirc. / 4						X	<u>W/E11EA2.2</u> Adherence to appropriate procedures and operation within the limits in the facility's license and amendments	4.2	1	
000022 Loss of Reactor Coolant Makeup / 2				X			<u>022AA1.01</u> Operate/monitor CVCS Letdown and Charging as applied to loss of Reactor Coolant Makeup. (RO)	3.3	1	
000025 Loss of RHR System / 4						X	<u>025AA2.06</u> Ability to determine/interpret existence of proper RHR protection.	3.4	1	
000027 Pressurizer Pressure Control System Malfunction / 3	X						<u>027AK1.01</u> Operational implications of the definition of saturation temperature. (RO)	3.4	1	
000032 Loss of Source Range NI / 7				X			<u>032AA1.01</u> Ability to operate and or monitor manual power restoration as applied to loss of SR nuclear instrumentation. (RO)	3.4	1	
000033 Loss of Intermediate Range NI / 7				X			<u>033AA1.02</u> Ability to operate and/or monitor level trip bypass as applied to loss of IR nuclear instrumentation. (RO)	3.1	1	
000037 Steam Generator Tube Leak / 3						X	<u>037AA2.10</u> Ability to determine and interpret tech spec limits for RCS leakage as applied to a SGT. (RO)	4.1	1	
000038 Steam Generator Tube Rupture / 3						X	<u>38EA2.03</u> Ability to determine or interpret which S/G is ruptured. (RO)	4.6	1	
000054 (CE/E06) Loss of Main Feedwater / 4			X				<u>054AK3.05</u> Reasons for HPI/PORV cycling upon total feedwater loss as applied to loss of MFW. (RO)	4.7	1	
BW/E04; W/E05 Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4							NOT SELECTED			
000058 Loss of DC Power / 6							NOT SELECTED			
000060 Accidental Gaseous Radwaste Release. / 9			X				<u>060AK3.02</u> Reason for isolation of auxiliary building ventilation. (RO)	3.5	1	
000061 ARM System Alarms / 7			X				<u>061AK3.02</u> Reasons for guidance contained in alarm response (RO)	3.6	1	

Emergency and Abnormal Plant Evolutions – Tier 1/Group 2  
(CONTINUED)

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
W/E16 High Containment Radiation / 9					X		<b>W/E16EA2.2</b> Determine/interpret adherence to appropriate procedures and operation within the limitations in the facilities license and amendments.	3.3	1
000065 Loss of Instrument Air / 8						X	<b>2.4.18</b> Knowledge of specific bases for EOPs	3.6	1
CE/E09 Functional Recovery							N/A	N/A	N/A
<b>(RO) Question repeated from Reactor Operator Exam.</b>									
<b>K/A Category Totals:</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>Group Point Total:</b>		<b>16</b>

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 3							For ES-401-3	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2		X					<b>028AK2.03</b> Interrelation with sensors and positioners <b>(RO)</b> .	2.9	1
000036 (BW/A08) Fuel Handling Accident / 8					X		<b>036A2.03</b> Determine/interpret magnitude of potential radioactive release as applied to a fuel handling accident.	4.2	1
000056 Loss of Off-site Power / 6						X	<b>2.4.1</b> Knowledge of EOP entry conditions and immediate action steps. <b>(RO)</b>	4.6	1
BW/E13&14 EOP Rules and Enclosures							N/A	N/A	N/A
BW/A05 Emergency Diesel Actuation / 6							N/A	N/A	N/A
BW/A07 Flooding / 8							N/A	N/A	N/A
CE/A16 Excess RCS Leakage / 2							N/A	N/A	N/A
W/E13 Steam Generator Over-pressure / 4							NOT SELECTED		
W/E15 Containment Flooding / 5							DESELECTED		
<b>(RO) Question repeated from Reactor Operator Exam.</b>									
<b>K/A Category Totals:</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>Group Point Total:</b>		<b>3</b>

ES-401	PWR SRO Examination Outline Plant Systems – Tier 2/Group 1											For ES-401-3		
E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive								X				<b>001A2.01</b> Predict impact of loss of CCW or cooling fan and use procedures to correct, control, or mitigate consequences. (RO)	3.7	1
003 Reactor Coolant Pump							X					<b>003A1.06</b> Predict/monitor changes in PZR spray flow associated with operating RCP controls. (RO)	3.1	1
004 Chemical and Volume Control					X							<b>004K5.19</b> Operational implications of SDM as it applies to CVCS. (RO)	3.9	1
013 Engineering Safety Features Actuation		X				X						<b>013K6.01</b> Knowledge of the effect of a loss or malfunction of sensors and detectors.	3.1	2
												<b>013K2.01</b> Bus power supplies to ESFAS/Safeguards equipment control. (RO)	3.8	
014 Rod Position Indication											X	<b>2.1.12</b> Ability to apply technical specifications for a system.	4.0	1
015 Nuclear Instrumentation		X										<b>2.1.22</b> Ability to determine mode of operation. (RO)	3.3	2
												<b>015K2.01</b> Knowledge of bus power supplies to NIS channels, components, and interconnections.	3.7	
017 In-core Temperature Monitor			X									<b>017K3.01</b> Effect of loss/malfunction of ITM system on natural circulation indications. (RO)	3.7	2
												<b>017A2.02</b> Predict impact of core damage on the ITM system, use procedures to correct, control, or mitigate consequences.	4.1	
022 Containment Cooling											X	<b>022A4.02</b> Ability to manually operate and/or monitor CSS pumps in the control room. (RO)	3.7	1
025 Ice Condenser												N/A	N/A	N/A
026 Containment Spray								X				<b>026A2.03</b> Ability to predict the impacts of an ESF failure or operations on the CSS and based upon these predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations.	4.4	1
056 Condensate								X				<b>056A2.04</b> Predict impact of loss of condensate pumps on condensate system. (RO)	2.8	1

ES-401	PWR SRO Examination Outline Plant Systems – Tier 2/Group 1 (CONTINUED)											Form ES-401-3		
E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
059 Main Feedwater								X				<u>059A2.07</u> Predict impact of tripping MFW pump turbine on MFW and use procedures to correct, control, or mitigate consequences. (RO)	3.3	1
061 Auxiliary/Emergency Feedwater							X					<u>061A1.04</u> Predict/monitor changes in AFW source tank level associated with operating the AFW controls. (RO)	3.9	1
063 DC Electrical Distribution											X	<u>2.1.12</u> Knowledge of surveillance procedures.	4.0	1
068 Liquid Radwaste									X			<u>068A3.02</u> Ability to monitor automatic operation of the liquid radwaste system including automatic isolation. (RO)	3.6	1
071 Waste Gas Disposal				X								<u>071K4.04</u> Knowledge of design feature(s)/interlock(s) which provide isolation of waste gas release tanks (RO)	3.4	1
072 Area Radiation Monitoring										X		<u>072A4.01</u> Manually operate/monitor alarm and interlock setpoint checks and adjustments in the control room. (RO)	3.3	1
(RO) Question repeated from Reactor Operator Exam.														
K/A Category Totals:	0	2	1	1	1	1	2	5	1	2	3	Group Point Total:		19

ES-401	PWR SRO Examination Outline Plant Systems – Tier 2/Group 2											For ES-401-3		
E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant									X			<b>002A3.03</b> Monitor automatic operation of RCS pressure, temperature, and flows. (RO)	4.6	1
006 Emergency Core Cooling							X					<b>006A1.02</b> Predict/monitor changes in boron concentration in accumulator, boron storage tanks associated with operating ECCS (RO)	3.6	1
010 Pressurizer Pressure Control				X								<b>010K4.01</b> Design features/interlocks for spray valve warm-up. (RO)	2.9	1
011 Pressurizer Level Control										X		<b>011A4.03</b> Manually operate/monitor PZR heaters in the control room. (RO)	3.1	1
012 Reactor Protection										X		<b>012A4.03</b> Manually operate/monitor channel blocks/bypasses in the control room. (RO)	3.6	1
016 Non-Nuclear Instrumentation											X	<b>2.2.2</b> Ability to manipulate console controls to operate facility between shutdown and designated power levels. (RO)	3.5	1
027 Containment Iodine Removal												N/A	N/A	N/A
028 Hydrogen Recombiner and Purge Control								X				<b>028A2.02</b> Malfunctions or operations on the HRPS; and based on these predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations during a LOCA condition and related concern over hydrogen.	3.9	1
029 Containment Purge								X				<b>029A2.03</b> Predict impact of startup operations and associated valve lineups and use procedures to correct, control, or mitigate consequences. (RO)	3.1	1
033 Spent Fuel Pool Cooling	X											<b>033K1.02</b> Physical connections/cause-effect relationship between Spent Fuel Pool Cooling system and the RHRS. (RO)	2.7	1
034 Fuel Handling Equipment											X	<b>2.1.10</b> Knowledge of conditions and limitations in the facility license.	3.9	1
035 Steam Generator			X									<b>035K5.01</b> Knowledge of operational implications as applied to secondary parameters, pressure, temp. and reactivity. (RO)	3.9	1
039 Main and Reheat Steam	X											<b>039K1.01</b> Physical connections/cause-effect relationship between MRSS and S/G. (RO)	3.2	1
055 Condenser Air Removal			X									<b>055K3.01</b> Effect of loss/malfunction of the CARS on main condenser. (RO)	2.7	1

ES-401

PWR SRO Examination Outline  
Plant Systems – Tier 2/Group 2  
(CONTINUED)

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
062 AC Electrical Distribution				X								<b>062K4.07</b> Design features/interlocks which provide for one-line diagram of 4 kV to 480v distribution, including sources of normal and alternative power. (RO)	3.1	1
064 Emergency Diesel Generator												DE SELECTED		
073 Process Radiation Monitoring												DE SELECTED		
075 Circulating Water												DE SELECTED		
079 Station Air	X											<b>079K1.01</b> Physical connections/cause-effect relationships between the SAS and IAS (RO).	3.1	1
086 Fire Protection						X						<b>086K6.04</b> Effects of loss/malfunction of fire, smoke, and heat detectors on the Fire Protection System. (RO).	2.9	1
103 Containment								X				<b>103A2.03</b> Ability to predict the impacts of Phase A and B isolation on the containment system and based on those predictions, use procedures to correct, control, or mitigate the consequences.	3.8	1
(RO) Question repeated from Reactor Operator Exam.														
K/A Category Totals:	3	0	1	2	1	1	1	3	1	2	2	Group Point Total:		17

ES-401 PWR SRO Examination Outline For ES-401-3  
 Plant Systems – Tier 2/Group 3

E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal			X									005K4.03 Knowledge of RHRS design features and/or interlocks which provide RHR heat exchanger bypass flow control. (RO)	3.2	1
007 Pressurizer Relief/Quench Tank	X											007K1.01 Physical connections and/or cause-effect relationship between PRTS and the containment system. (RO)	3.1	1
008 Component Cooling Water				X								008A2.01 Ability to predict the impacts of Loss of CCW pump on the CCWS and based on these predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations.	3.6	1
041 Steam Dump/Turbine Bypass Control				X								041K4.18 Knowledge of the SDS design feature(s) and/or interlocks(s) which provide for a turbine trip. (RO)	3.6	1
045 Main Turbine Generator												DE SELECTED		
076 Service Water												DE SELECTED		
078 Instrument Air												NOT SELECTED		
K/A Category Totals:	1	0	0	2	0	0	0	1	0	0	0	Group Point Total		4

(RO) Question repeated from Reactor Operator Exam.

Plant-Specific Priorities		
System / Topic	Recommended Replacement for...	Reason
Plant-Specific Priority Total: (limit 10)		