

**INITIAL SUBMITTAL OF THE OUTLINE**

**FOR THE POINT BEACH INITIAL EXAMINATION - JAN/FEB 2002**

**NOTE: THERE WERE NO NRC COMMENTS ON THE OUTLINE**

## Outline Submittal

Contains the following:

### Outline Submittal Letter from Licensee

ES-201-1	Examination Preparation Checklist
ES-201-2	Examination Outline Quality Checklist
ES-301-1	Administrative Topics Outline (RO)
ES-301-1	Administrative Topics Outline (SRO)
ES-301-2	Control Room and Facility Walk-Through Test Outline (RO)
ES-301-2	Control Room and Facility Walk-Through Test Outline (SROI)
ES-301-2	Control Room and Facility Walk-Through Test Outline (SROU)
ES-301-5	Transient and Event Checklist
ES-301-6	Competencies Checklist
D-1	Dynamic Simulator Scenario Outline for 2 scenarios
ES-401-3	PWR SRO Examination Outline
ES-401-4	PWR RO Examination Outline
ES-401-10	Record of Rejected K/As
Admin	There were no NRC Comments on the submitted test outlines

October 9, 2001

Mr. D. E. Hills, Chief  
Operations Branch  
U. S. Nuclear Regulatory Commission  
Region III  
801 Warrenville Road  
Lisle, IL 60532-4351

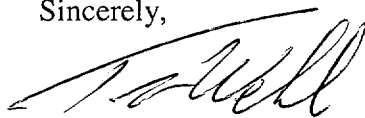
Dear Mr. Hills:

POINT BEACH NUCLEAR PLANT  
INITIAL OPERATOR LICENSING EXAMINATION OUTLINES

In response to your letter dated October 2, 2001, enclosed are the initial operator licensing examination outlines. As confirmed with your staff, the examinations are scheduled for the weeks of January 28 and February 4, 2002. NUREG 1021 physical security requirements state that the enclosed examination materials shall be withheld from public disclosure until after the examination is complete.

Please contact Mr. Chuck Sizemore at 920/755-6123 if you have questions regarding the examination outlines or require additional information.

Sincerely,



Thomas J. Webb  
Licensing Director

FAF/tyf

Enclosures

NRC 2001-069

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bcc w/oe: C. Sizemore  
File

W. P. Walker

F. A. Flentje

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model per ES-401.	PS	11/1	dm
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	PS	11/1	dm
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	PS	11/1	dm
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	PS	11/1	dm
2. S I M	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument failures, and major transients.	PS	11/1	dm
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity; ensure each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s)*, and scenarios will not be repeated over successive days.	PS	11/1	dm
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	PS	11/1	dm
3. W / T	a. Verify that: (1) the outline(s) contain(s) the required number of control room and in-plant tasks, (2) no more than 30% of the test material is repeated from the last NRC examination, (3) *no tasks are duplicated from the applicants' audit test(s), and (4) no more than 80% of any operating test is taken directly from the licensee's exam banks.	PS	11/1	dm
	b. Verify that: (1) the tasks are distributed among the safety function groupings as specified in ES-301, (2) one task is conducted in a low-power or shutdown condition, (3) 40% of the tasks require the applicant to implement an alternate path procedure, (4) one in-plant task tests the applicant's response to an emergency or abnormal condition, and (5) the in-plant walk-through requires the applicant to enter the RCA.	PS	11/1	dm
	c. Verify that the required administrative topics are covered, with emphasis on performance-based activities.	PS	11/1	dm
	d. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on successive days.	PS	11/1	dm
4. G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam section.	PS	11/1	dm
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	PS	11/1	dm
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	PS	11/1	dm
	d. Check for duplication and overlap among exam sections.	PS	11/1	dm
	e. Check the entire exam for balance of coverage.	PS	11/1	dm
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	PS	11/1	dm
a. Author b. Facility /Reviewer (*) c. NRC Chief Examiner (#) d. NRC Supervisor		Printed Name / Signature <u>Phillip A. Short / Phillip A. Short</u> <u>Huck Sizemore / Charles P. Sizemore</u> <u>R. Michael Morris / Raymond S. Morris</u> <u>David C. Wells / David C. Wells</u>		Date <u>10-8-01</u> <u>10-8-01</u> <u>11/12/01</u> <u>11/15/01</u>
Note: * Not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c;" chief examiner concurrence required.				

Facility: **POINT BEACH NUCLEAR PLANT**

Date of Examination: 1/28/02-2/01/02

Examination Level (circle one): **RO** / SROOperating Test Number: **2002301**

Administrative Topic/Subject Description		Describe method of evaluation: ONE Administrative JPM, OR TWO Administrative Questions
A.1	Conduct of Operations/ <b>Shift Turnover</b> (2.1.3)	<b>JPM:</b> Conduct Control Board Walk-down for Shift Turnover (Identify 4 of 5 abnormal items) Write a JPM with abnormal items different from last exam.
	<b>Plant Parameter Verification</b> (2.1.25)	<b>JPM:</b> Perform a Quadrant Power Tilt Calculation
A.2	Equipment Control/ <b>Tagging &amp; Clearances</b> (2.2.13)	<b>JPM:</b> Review Tag Series for adequacy. (Write a new JPM)
		N/A
A.3	Radiation Control/ <b>Performance of Procedures to Guard Against Personnel Exposure</b> (2.3.10)	<b>JPM:</b> Verify proper response of the Control Room Ventilation System to a high radiation alarm.
		N/A
A.4	Emergency Plan/ <b>Emergency Facilities</b> (2.4.29)	<b>JPM:</b> Supply Technical Support Center (TSC) with Emergency Power.
		N/A

Facility: **POINT BEACH NUCLEAR PLANT**

Date of Examination: 1/28/02-2/01/02

Examination Level (circle one): RO / **SRO**Operating Test Number: **2002301**

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2 TWO Administrative Questions
A.1	Conduct of Operations/ <b>Shift Turnover</b> (2.1.3)	<b>JPM:</b> Conduct Control Board Walk-down for Shift Turnover (Identify 4 of 5 abnormal items) Write a JPM with abnormal items different from last exam.
	<b>Plant Parameter Verification</b> (2.1.25)	<b>JPM:</b> Perform a Quadrant Power Tilt Calculation
A.2	Equipment Control/ <b>Tagging &amp; Clearances</b> (2.2.13)	<b>JPM:</b> Review Tag Series for adequacy. (Write a new JPM)
		N/A
A.3	Radiation Control/ <b>Knowledge of Significant Radiation Hazards</b> (2.3.1)	<b>JPM:</b> Determine the specific DSS responsibilities for entering the Containment Keyway, as well as the minimum radiological monitoring requirements.
		N/A
A.4	Emergency Plan/ <b>Emergency Action Levels and Classifications</b> (2.4.41)	<b>JPM:</b> Emergency Plan Classification (includes initial and subsequent classification). Conditions will be very similar to Scenario #1 (LBLOCA) so that this may be administered after the scenario if desired.

Facility: **POINT BEACH NUCLEAR PLANT**  
 Exam Level (circle one): **RO** / SRO (I) / SRO(U)

Date of Examination: 1/28/02-2/01/02  
 Operating Test No: **2002301**

### B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. <i>Chemical and Volume Control System</i> / <u>Respond To Multiple Stuck Rods Following A Reactor Trip (Emergency Boration).</u>	M, S, A, L	1
b. <i>Emergency Core Cooling System</i> / <u>Drain an SI Accumulator</u>	D, S	2
c. <i>Pressurizer Pressure Control System</i> / <u>Control Pressurizer Pressure Using the Pressurizer Pressure Controller.</u>	D, S, L	3
d. <i>Reactor Coolant Pump System</i> / <u>Start a Reactor Coolant Pump.</u>	D, S, L	4
e. <i>Containment Spray System</i> / <u>Respond To A Failure of the Containment Spray System.</u>	N, S, A, L (ESF)	5
f. <i>A.C. Electrical Distribution</i> / <u>Synchronize Turbine Generator and Phase onto the Grid.</u>	D, S	6
g. <i>Component Cooling Water System</i> / <u>Respond to a Loss of Component Cooling Water.</u>	D, S, A Last NRC Exam	8

### B.2 Facility Walk-Through

a. <i>Emergency Core Cooling System</i> / <u>Makeup to RWST During Loss of Containment Sump Recirculation</u>	D, R	2
b. <i>Main Steam System</i> / <u>Perform Local Actions for Isolating a S/G</u>	D, R	4
c. <i>Emergency Diesel Generators</i> / <u>Fast Start an Emergency Diesel Generator Locally</u>	D, A Last NRC Exam Different EDG	6

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA



Facility: **POINT BEACH NUCLEAR PLANT**  
Exam Level (circle one): RO / **SRO (I)** / SRO(U)

Date of Examination: 1/28/02-2/01/02  
Operating Test No: **2002301**

### B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
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e. <i>Containment Spray System</i> / <u>Respond To A Failure of the Containment Spray System.</u>	N, S, A, L (ESF)	5
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g. <i>Component Cooling Water System</i> / <u>Respond to a Loss of Component Cooling Water.</u>	D, S, A Last NRC Exam	8

### B.2 Facility Walk-Through

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Facility: **POINT BEACH NUCLEAR PLANT**  
 Exam Level (circle one): RO / SRO (I) / **SRO(U)**

Date of Examination: 1/28/02-2/01/02  
 Operating Test No: **2002301**

### B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. <i>Chemical and Volume Control System</i> / <u>Respond To Multiple Stuck Rods Following A Reactor Trip (Emergency Boration).</u>	M, S, A, L	1
b. <i>Containment Spray System</i> / <u>Respond To A Failure of the Containment Spray System.</u>	N, S, A, L (ESF)	5
c. <i>A.C. Electrical Distribution</i> / <u>Synchronize Turbine Generator and Phase onto the Grid.</u>	D, S	6

### B.2 Facility Walk-Through

a. <i>Emergency Core Cooling System</i> / <u>Makeup to RWST During Loss of Containment Sump Recirculation</u>	D, R	2
b. <i>Main Steam System</i> / <u>Perform Local Actions for Isolating a S/G</u>	D, R	4

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

OPERATING TEST NO.: **2002301**

Applicant Type	Evolution Type	Minimum Number	Scenario Number			
			1	2	3	4
RO	Reactivity	1	1	1	N/A	N/A
	Normal	1	1	1	N/A	N/A
	Instrument / Component	4	2,3,4 5,7,8	2,3,4 6,7,8	N/A	N/A
	Major	1	6	5,9	N/A	N/A

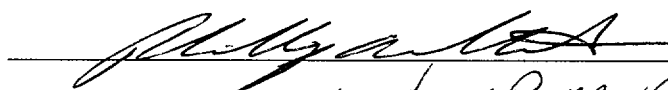
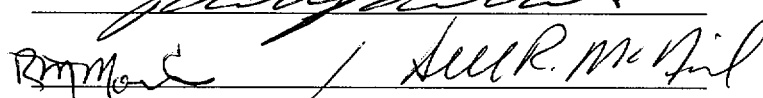
As RO	Reactivity	1	1	1	N/A	N/A
	Normal	0	----	----	N/A	N/A
	Instrument / Component	2	2,5,7	3,4,6	N/A	N/A
	Major	1	6	5,9	N/A	N/A
SRO-I						
As SRO	Reactivity	0	----	----	N/A	N/A
	Normal	1	1	1	N/A	N/A
	Instrument / Component	2	2,3,4 5,7,8	2,3,4 6,7,8	N/A	N/A
	Major	1	6	5,9	N/A	N/A

SRO-U	Reactivity	0	----	----	N/A	N/A
	Normal	1	1	1	N/A	N/A
	Instrument / Component	2	2,3,4 5,7,8	2,3,4 6,7,8	N/A	N/A
	Major	1	6	5,9	N/A	N/A

- Instructions:
- (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
  - (2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
  - (3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author:

NRC Reviewer:

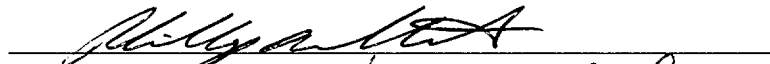
  


Competencies	Applicant #1 <b>RO/SRO-I/SRO-U</b>				Applicant #2 <b>RO/SRO-I/SRO-U</b>				Applicant #3 <b>RO/SRO-I/SRO-U</b>			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms	2,5,6 7	2,4,5 7,9	N/A	N/A	2-6	3-6 9	N/A	N/A	3-6	2-7 9	N/A	N/A
Diagnose Events and Conditions	2,5,6 7	2,4,5, 7,8,9	N/A	N/A	2-7	3-6 9	N/A	N/A	3,4,5 6,8	2-9	N/A	N/A
Understand Plant and System Response	1,2,5 6,7	1,2,4 5,9	N/A	N/A	ALL	1,3,4 5,6,9	N/A	N/A	1,3,4 5,6,8	ALL	N/A	N/A
Comply With and Use Procedures (1)	1,2,5 6,7	1,2,4 5,9	N/A	N/A	ALL	1,3,4 5,6,9	N/A	N/A	1-6 8	ALL	N/A	N/A
Operate Control Boards (2)	1,5,6 7	1,2,4, 5,7,8, 9	N/A	N/A	N/A	1,3,4 5,6,9	N/A	N/A	1-6 8	N/A	N/A	N/A
Communicate and Interact With the Crew	1,2,5 6,7	1,2,4, 5,7,8, 9	N/A	N/A	ALL	1,3,4 5,6,9	N/A	N/A	1-6 8	ALL	N/A	N/A
Demonstrate Supervisory Ability (3)	N/A	N/A	N/A	N/A	ALL	N/A	N/A	N/A	N/A	ALL	N/A	N/A
Comply With and Use Tech. Specs. (3)	N/A	N/A	N/A	N/A	2,3,4	N/A	N/A	N/A	N/A	2,3	N/A	N/A
Notes:  (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U (3) Only applicable to SROs.												

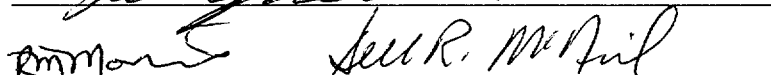
## Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author:



NRC Reviewer:



Facility : PBNP Scenario No.: 1 OP-Test No.: 2002301

Examiners: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Initial Conditions:** Unit 1 is at 8% Power, BOL, equilibrium xenon conditions following a reactor trip from full power five days ago due to a failure of the Unit 1 Voltage Regulator. Unit 2 is at 100% Power. Present clock time is real time. Normal shift complement with exception of 3<sup>rd</sup> SRO.

**Turnover:** G-01 EDG is out of service for annual maintenance. It was taken OOS 2 days ago, and is expected to be returned to service in 3 days. G-02 EDG is aligned to 4.16 kV buses 1-AO5 and 2-AO5 IAW OI-35A. P-38B, Electric Auxiliary Feedwater Pump was declared inoperable 4 hours ago due to recirculation line cracks and has just been tagged out for repair.

A Severe Thunderstorm Watch is in effect for the next 4 hours.

The RCS is at normal operating pressure and temperature.

Steam Generator water level is being controlled with the Main Feed Reg Valves in manual and a single train of feedwater and condensate.

OP-1C, "Low Power Operation to Normal Power Operation" is in progress. You are to continue with unit startup per OP-1C.

Event No.	Malf. No.	Event Type*	Event Description
1		R – RO N – SRO BOP	Perform an up-power IAW OP-1C.
2		I – ALL	T <sub>hot</sub> instrument 1TE-401A fails high.
3		C/I-BOP SRO	Running CCW Pump Shaft seizure with failure of standby pump to auto start.
4		I – BOP SRO	S/G Pressure Transmitter PT-478 fails high.
5		C – ALL	RCS leak develops in "A" RCS Loop.
6		M– ALL	RCS leak degrades to a Large Break LOCA.
7		C – RO SRO	Failure of Auto SI to Actuate.
8		C – BOP SRO	1SI-852A fails to open.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility : PBNP Scenario No.: 2 OP-Test No.: 2002301

Examiners: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Initial Conditions:** Unit 1 is at 100% Power, MOL. Unit 2 is at 100% Power. Present clock time is real time. Normal shift complement with exception of 3<sup>rd</sup> SRO.

**Turnover:** G-01 EDG is out of service for annual maintenance. It was taken OOS 2 days ago, and is expected to be returned to service in 3 days. G-02 EDG is aligned to 4.16 kV buses 1-AO5 and 2-AO5 IAW OI-35A. P-38B, Electric Auxiliary Feedwater Pump was declared inoperable 4 hours ago due to recirculation line cracks and has just been tagged out for repair.

A Severe Thunderstorm Watch is in effect for the next 4 hours.

Unit 1 is making preparations for reducing power for testing of the Atmospheric and Condenser Steam Dumps.

The objective of the shift is to reduce power to <95% for stroke testing of the dumps.

OP-2A, "Normal Power Operation" is the procedure in effect for the downpower (<10% load reduction).

Event No.	Malf. No.	Event Type*	Event Description
1		R - RO N - BOP SRO	Perform a down-power IAW OP-2A.
2		C - BOP SRO	A running Service Water Pump Trips
3		I - RO SRO	LT-428, Pressurizer Level Transmitter (controlling channel) fails high..
4		C - ALL	Loss of Condenser Vacuum
5		M- ALL	Condenser Vacuum degrades to reactor trip criteria.
6		C - RO SRO	Main Turbine Fails to AUTO & MANUALLY Trip.
7		C - BOP SRO	1P-29, Turbine Driven Auxiliary Feedwater Pump trips on overspeed.
8		C - BOP SRO	P-38A, Electric Driven Auxiliary Feedwater Pump Discharge Valve Controller Fails.
9		M - ALL	Loss of Heat Sink that is recoverable using Main Feedwater.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Point Beach Nuclear Plant					Date of Exam: 2/2/02				Exam Level: SRO				
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	3	2	6				4	5			4	24
	2	3	0	3				3	4			3	16
	3	0	0	1				0	1			1	3
	Tier Totals	6	2	10				7	10			8	43
2. Plant Systems	1	0	1	3	2	1	1	4	2	3	2	0	19
	2	3	1	1	3	3	1	0	1	1	1	2	17
	3	3	0	0	0	0	0	0	1	0	0	0	4
	Tier Totals	6	2	4	5	4	2	4	4	4	3	2	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		17
					4		3		4		6		
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). 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 exam must total 100 points. 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. 4. Systems/evolutions within each group are identified on the associated outline. 5. The shaded areas are not applicable to the category/tier. 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. 7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO 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.													

ES-401		PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions – Tier I/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						<b>001.AK1.05</b> Knowledge of the operational implications of the effects of turbine-reactor power mismatch on rod control as applied to Continuous Rod Withdrawal. (RO)	3.8	1
000003 Dropped Control Rod / 1			X			X	<b>2.4.11</b> Knowledge of abnormal condition procedures. (RO) <b>003.AK3.05</b> Knowledge of the reasons for Tech-Spec Limits for reduction of load to 50% power if flux cannot be brought back within specified target band as applied to a Dropped Rod.	3.6 4.1	2
000005 Inoperable/Stuck Control Rod / 1				X			<b>005.AA1.04</b> Ability to operate and/or monitor reactor power and turbine power as they apply to the inoperable/stuck control rod. (RO)	3.9	1
000011 Large Break LOCA / 3				X			<b>011.EA1.04</b> Ability to operate/monitor ESF actuation in manual as applied to a Large Break LOCA. (RO)	4.4	1
W/E04 LOCA Outside Containment / 3						X	<b>2.1.7</b> Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation. (RO)	4.4	1
W/E01 & E02 Re-diagnosis & SI Termination / 3					X		<b>W/E01.EA2.1</b> Ability to determine/interpret facility conditions and selection of appropriate procedures during abnormal and emergency operation as applied to reactor trip or safety injection re-diagnosis. (RO)	4.0	1
000015/17 RCP Malfunctions / 4	X						<b>015/017.AK1.02</b> Knowledge of operational implications of the consequences of an RCP failure (RCP Malfunction). (RO)	4.1	1
BW/E09; CE/A13; W/E09 & E10 Natural Circ. / 4						X	<b>2.4.47</b> Ability to diagnose/recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (RO)	3.7	1
000024 Emergency Boration / 1			X				<b>024.AK3.02</b> Knowledge of the reasons for actions contained in the EOP for emergency boration. (RO)	4.4	1
000026 Loss of Component Cooling Water / 8						X	<b>2.4.11</b> Knowledge of abnormal condition procedures.	3.6	1
000029 Anticipated Transient w/o Scram / 1			X				<b>029.EK3.12</b> Knowledge of the reasons for the actions contained in the EOP for ATWS.	4.7	1
000040 (BW/E05, CE/E05; W/E12) Steam Line Rupture – Excessive Heat Transfer / 4			X				<b>W/E12.EK3.3</b> Knowledge for the reasons for manipulation of controls required to obtain desired operating results during uncontrolled depressurization of all Steam Generators. (RO)	3.7	1
CE/A11; W/E08 RCS Overcooling – PTS /4				X			<b>W/E08.EA1.3</b> Ability to operate and/or monitor the desired operating results during abnormal and emergency situations as applied to PTS. (RO)	4.0	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	
000051 Loss of Condenser Vacuum / 4					X		<b>051.AA2.02</b> Ability to determine/interpret the conditions requiring a reactor and/or turbine trip as applied to a Loss of Condenser Vacuum. (RO)	4.1	1	
000055 Station Blackout / 6			X				<b>055.EK3.02</b> Knowledge of the reasons for actions contained in the EOP for loss of offsite and onsite power (Station Blackout). (RO)	4.6	1	
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		<b>057.AA2.19</b> Ability to determine/interpret the plant automatic actions that will occur on a Loss of AC vital electrical instrument bus. (RO)	4.3	1	
000059 Accidental Liquid RadWaste Release / 9			X				<b>059.AK3.01</b> Knowledge of reasons for termination of a release of radioactive liquid as applied to an accidental radioactive liquid release. (RO)	3.9	1	
000062 Loss of Nuclear Service Water / 4					X		<b>062.AA2.02</b> Ability to determine/interpret the cause of possible SWS loss. (RO)	3.6	1	
000067 Plant Fire On-site / 9	X						<b>067.AK1.02</b> Knowledge of the operational implications of fire fighting as they apply to a Plant Fire On-Site. (RO)	3.9	1	
000068 (BW/A06) Control Room Evacuation / 8		X					<b>068.AK2.02</b> Knowledge of the interrelations between the Control Room Evacuation and the Reactor Trip System. (RO)	3.9	1	
000069 (W/E14) Loss of CTMT Integrity / 5				X			<b>069.AA1.01</b> Ability to operate and/or monitor isolation valves, dampers, and electro-pneumatic devices as applied to a Loss of Containment Integrity. (RO)	3.7	1	
000074 (W/E06&E07) Inadequate Core Cooling / 4					X		<b>074.EA2.06</b> Ability to determine or interpret changes in PZR level due to PZR steam bubble transfer to the RCS during ICC. (RO)	4.6	1	
BW/E03 Inadequate Subcooling Margin / 4							N/A	N/A	N/A	
000076 High Reactor Coolant Activity / 9		X					<b>076.AK2.01</b> Knowledge of the interrelationships between High RCS Activity and process radiation monitors. (RO)	3.0	1	
BW/A02&A03 Loss of NNI-XY / 7							N/A	N/A	N/A	
K/A Category Totals:	3	2	6	4	5	4	Group Point Total:		24	
(RO) Question repeated from Reactor Operator Exam.										

ES-401		PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 2							Form ES-401-3	
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>007.EK3.01</u> Knowledge of reasons for the actions contained in the EOP as applied to a reactor trip. (RO)	4.6	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>008.AK1.01</u> Knowledge of the operational implications of the thermodynamics and flow characteristics of open or leaking valves as they apply to a PZR Vapor Space Accident. (RO)	3.7	1	
000009 Small Break LOCA / 3						X	<u>2.4.18</u> Knowledge of the specific bases for EOPS's.	3.6	1	
BW/E08; W/E03 LOCA Cooldown – Depress. / 4				X			<u>W/E03.EA1.3</u> Ability to operate and/or monitor desired operating results during abnormal and emergency situations as applied to LOCA C/D and Depressurization.	4.1	1	
W/E11 Loss of Emergency Coolant Recirc. / 4					X		<u>W/E11.EA2.2</u> Ability to determine/interpret adherence to appropriate procedures and operations within the limitations in the facilities license and amendments as applied to Loss of Emergency Coolant Recirculation. (RO)	4.2	1	
000022 Loss of Reactor Coolant Makeup / 2					X		<u>022.AA2.04</u> Ability to determine/interpret how long PZR level can be maintained within limits as applied to a loss of RCP Makeup. (RO)	3.8	1	
000025 Loss of RHR System / 4	X						<u>025.AK1.01</u> Knowledge of the operational implications of a Loss of RHR during all modes of operation. (RO)	4.3	1	
000027 Pressurizer Pressure Control System Malfunction / 3			X				<u>027.AK3.03</u> Knowledge of the reasons for the actions contained in the EOP as they apply to PZR Pressure Control System malfunctions. (RO)	4.1	1	
000032 Loss of Source Range NI / 7					X		<u>032.AA2.06</u> Ability to determine and interpret confirmation of reactor trip as applied to Loss of Source Range NI.	4.1	1	
000033 Loss of Intermediate Range NI / 7			X				<u>033.AK3.01</u> Knowledge of the reasons for termination of startup following loss of intermediate range nuclear instrumentation. (RO)	3.6	1	
000037 Steam Generator Tube Leak / 3	X						<u>037.AK1.02</u> Knowledge of the operational implications of leak-rate vs. pressure drop as applied to Steam Generator Tube Leak. (RO)	3.9	1	
000038 Steam Generator Tube Rupture / 3				X			<u>038.EA1.36</u> Ability to operate/monitor cooldown of RCS to specified temperature as applied to a SGTR. (RO)	4.5	1	
000054 (CE/E06) Loss of Main Feedwater / 4					X		<u>054.AA2.03</u> Ability to determine/interpret the conditions and reasons for AFW pump startup as applied to a Loss of MFW. (RO)	4.2	1	

ES-401

PWR SRO Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1/Group 2  
(CONTINUED)

Form ES-401-3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
BW/E04; W/E05 Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4						X	<b>2.4.6</b> Knowledge of symptom based EOP mitigation strategies. (RO)	4.0	1
000058 Loss of DC Power / 6						X	<b>2.1.12</b> Ability to apply technical specifications for a system.	4.0	1
000060 Accidental Gaseous Radwaste Release. / 9							<b>DESELECTED *</b>		
000061 ARM System Alarms / 7							<b>DESELECTED</b>		
W/E16 High Containment Radiation / 9				X			<b>W/E16.EA1.2</b> Ability to operate and/or monitor operating behavior characteristics of the facility as applied to High Containment Radiation. (RO)	3.0	1
000065 Loss of Instrument Air / 8							<b>DESELECTED</b>		
CE/E09 Functional Recovery							N/A	N/A	N/A
K/A Category Totals:	3	0	3	3	4	3	Group Point Total:		16

(RO) Question repeated from Reactor Operator Exam.

**\* DESELECTED MEANS "NOT SELECTED DURING RANDOM PROCESS"**

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	<u>2.4.31</u> Knowledge of annunciators, alarms, and indications, and use of the response instructions. (RO)	3.4	1	
000036 (BW/A08) Fuel Handling Accident / 8			X				<u>036.AK3.02</u> Knowledge of the reasons for the interlocks associated with fuel handling equipment as applied to Fuel Handling Incidents. (RO)	3.6	1	
000056 Loss of Off-Site Power / 6					X		<u>056.AA2.07</u> Ability to determine and interpret operational status of emergency feedwater pump (motor driven) as applied to a Loss of Off-Site Power.	4.3	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							DESELECTED			
W/E15 Containment Flooding / 5							DESELECTED			
K/A Category Totals:	0	0	1	0	1	1	Group Point Total:		3	
(RO) Question repeated from Reactor Operator Exam.										

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>001.A3.03</b> Ability to monitor automatic operation of the CRDS, axial imbalance. (RO)	3.8	1
003 Reactor Coolant Pump							X					<b>003.A1.05</b> Ability to predict and/or monitor changes in parameters (to prevent exceeding limits) associated with operating the RCPS controls including RCS flow. (RO)	3.5	1
004 Chemical and Volume Control			X									<b>004.K3.08</b> Knowledge of the effect that a loss or malfunction of the CVCS will have on RCP seal injection. (RO)	3.8	2
							X					<b>004.A1.04</b> Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating CVCS controls including PZR pressure and level.	4.1	
013 Engineering Safety Features Actuation								X				<b>013.A2.06</b> Ability to predict the impacts of inadvertent ESFAS actuation and based on ability of this prediction, use procedures to correct, control, or mitigate the consequences.	4.0	2
										X		<b>013.A4.03</b> Ability to manually operate and/or monitor ESFAS initiation in the control room. (RO)	4.7	
014 Rod Position Indication							X					<b>014.A1.03</b> Ability to predict and/or monitor changes in parameters associated with operating the RPIS controls including PDIL. (RO)	3.8	1
015 Nuclear Instrumentation						X						<b>015.K6.04</b> Knowledge of the effect of a loss or malfunction of bistables and logic circuits will have on NIS. (RO)	3.2	1
017 In-core Temperature Monitor									X			<b>017.A3.01</b> Ability to monitor automatic operation of the ITM system including indications of normal, natural, and interrupted circulation of the RCS. (RO)	3.8	1
022 Containment Cooling								X				<b>022.A2.04</b> Ability to predict the impacts of a loss of service water on the Containment Cooling System and based on these predictions, use procedures to correct, control, or mitigate the consequences. (RO)	3.2	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
025 Ice Condenser												N/A	N/A	N/A
026 Containment Spray				X			X					<u>026.K4.06</u> Knowledge of CSS design feature(s) and/or interlock(s) which provide for iodine scavenging via the CSS. (RO) <u>026.A1.01</u> Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating CSS controls including containment pressure.	3.2 4.2	2
056 Condensate			X									<u>056.K3.01</u> Knowledge of the effect that a loss or malfunction of the condensate system will have on MFW. (RO)	2.4	1
059 Main Feedwater										X		<u>059.A4.11</u> Ability to manually operate and monitor in the control room recovery from auto feedwater isolation. (RO)	3.3	1
061 Auxiliary/Emergency Feedwater				X								<u>061.K4.06</u> Knowledge of AFW design feature(s) and/or interlock(s) which provide for AFW startup permissive. (RO)	4.2	1
063 DC Electrical Distribution		X										<u>063.K2.01</u> Knowledge of bus power supplies to major DC loads. (RO)	3.1	1
068 Liquid Radwaste									X			<u>068.A3.02</u> Ability to monitor automatic operation of Liquid Radwaste System including automatic isolation. (RO)	3.6	1
071 Waste Gas Disposal			X									<u>071.K3.05</u> Knowledge of the effect that a loss or malfunction of the Waste Gas Disposal System will have on ARM and PRM systems. (RO)	3.2	1
072 Area Radiation Monitoring					X							<u>072.K5.01</u> Knowledge of the operational implications of radiation theory, including sources, types, units, and effects as they apply to ARM system. (RO)	3.0	1
K/A Category Totals:	0	1	3	2	1	1	4	2	3	2	0	Group Point Total:		19

(RO) Question repeated from Reactor Operator Exam.

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>002.K5.11</b> Knowledge of the operational implications of the relationship between the effects of the primary coolant system and the secondary coolant system as applied to RCS. (RO)	4.2	1
006 Emergency Core Cooling				X								<b>006.K4.17</b> Knowledge of ECCS design feature(s) and/or interlocks which provide for SI valve interlock(s). (RO)	4.1	1
010 Pressurizer Pressure Control	X											<b>010.K1.02</b> Knowledge of the physical connections and/or cause-effect relationships between PZR PCS and ESFAS. (RO)	4.1	1
011 Pressurizer Level Control								X				<b>011.A2.06</b> Ability to predict the impacts of an inadvertent PZR spray actuation on the PZR LCS and based on these predictions, use procedures to correct, control, or mitigate the consequences. (RO)	3.9	1
012 Reactor Protection						X						<b>012.K6.06</b> Knowledge of the effect a loss or malfunction of sensors or detectors will have on RPS. (RO)	2.8	1
016 Non-Nuclear Instrumentation												N/A	N/A	N/A
027 Containment Iodine Removal												N/A	N/A	N/A
028 Hydrogen Recombiner and Purge Control					X							<b>028.K5.02</b> Knowledge of the operational implications of flammable hydrogen concentration as applied to HRPS.	3.9	1
029 Containment Purge				X								<b>029.K4.03</b> Knowledge of design feature(s) and/or interlock(s) which provide automatic purge isolation. (RO)	3.5	1
033 Spent Fuel Pool Cooling											X	<b>2.4.24</b> Knowledge of loss of cooling water procedures. (RO)	3.7	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>035.K5.01</b> Knowledge of operational implications on the effect of secondary parameters, pressure, and temperature on reactivity as applied to SGS. (RO)	3.9	1
039 Main and Reheat Steam	X											<b>039.K1.09</b> Knowledge of the physical connections and/or cause-effect relationships between MRSS and RMS. (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
055 Condenser Air Removal												<b>DESELECTED</b>		
062 AC Electrical Distribution			X									<b>062.K3.02</b> Knowledge of the effect that a loss or malfunction of the AC Distribution System will have on EDG. <b>(RO)</b>	4.4	1
064 Emergency Diesel Generator		X										<b>064.K2.02</b> Knowledge of bus power supplies to EDG Fuel Oil Pumps.	3.1	1
073 Process Radiation Monitoring										X		<b>073.A4.01</b> Ability to manually operate and/or monitor effluent release in the control room. <b>(RO)</b>	3.9	1
075 Circulating Water												<b>DESELECTED</b>		
079 Station Air				X								<b>079.K4.01</b> Knowledge of SAS design feature(s) and/or interlock(s) which provide for cross-connect with IAS. <b>(RO)</b>	3.2	1
086 Fire Protection	X											<b>086.K1.03</b> Knowledge of the physical connections and/or cause-effect relationship between the Fire Protection System and the AFW system. <b>(RO)</b>	3.5	1
103 Containment										X		<b>103.A3.01</b> Ability to monitor automatic operation of the containment system, including containment isolation. <b>(RO)</b>	4.2	1
K/A Category Totals:	3	1	1	3	3	1	0	1	1	1	2	Group Point Total:		17

(RO) Question repeated from Reactor Operator Exam.



ES-401		PWR SRO Examination Outline Plant Systems – Tier 2/Group 3											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
005 Residual Heat Removal								X				<b>005.A2.03</b> Ability to predict the impacts of RHR pump/motor malfunction on the RHRS and based on these predictions, use procedures to correct, control, or mitigate the consequences.	3.1	1
007 Pressurizer Relief/Quench Tank	X											<b>007.K1.01</b> Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the Containment. (RO)	3.1	1
008 Component Cooling Water												<b>DESELECTED</b>		
041 Steam Dump/Turbine Bypass Control												<b>DESELECTED</b>		
045 Main Turbine Generator	X											<b>045.K1.20</b> Knowledge of the physical connections and/or cause-effect relationships between MT/G system and the protection system. (RO)	3.6	1
076 Service Water												<b>DESELECTED</b>		
078 Instrument Air	X											<b>078.K1.05</b> Knowledge of the physical connections and/or cause-effect relationships between the IAS and MSIV air. (RO)	3.5	1
K/A Category Totals:	3	0	0	0	0	0	0	1	0	0	0	Group Point Total		4
(RO) Question repeated from Reactor Operator Exam.														

Facility: <b>PBNP</b>		Date of Exam: <b>2/2/02</b>		Exam Level: <b>SRO</b>	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	<u>2.1.4</u>	Knowledge of shift staffing requirements.	3.4	1	
	<u>2.1.6</u>	Ability to supervise and assume a management role during plant transients and upset conditions.	4.3	1	
	<u>2.1.7</u>	Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation. <b>(RO)</b>	4.4	1	
	<u>2.1.10</u>	Knowledge of conditions and limitations in the facility license. <b>(RO)</b>	3.9	1	
	<b>Total</b>			<b>4</b>	
Equipment Control	<u>2.2.11</u>	Knowledge of process for controlling temporary changes.	3.4	1	
	<u>2.2.22</u>	Knowledge of limiting conditions for operations and safety limits. <b>(RO)</b>	4.1	1	
	<u>2.2.25</u>	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1	
	<b>Total</b>			<b>3</b>	
Radiation Control	<u>2.3.1</u>	Knowledge of 10 CFR 20 and related facility radiation control requirements. <b>(RO)</b>	3.0	1	
	<u>2.3.4</u>	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1	
	<u>2.3.2</u>	Knowledge of facility ALARA program. <b>(RO)</b>	2.9	1	
	<u>2.3.8</u>	Knowledge of the process for performing a planned gaseous radioactive release.	3.2	1	
	<b>Total</b>			<b>4</b>	
Emergency Procedures/ Plan	<u>2.4.5</u>	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions. <b>(RO)</b>	3.6	1	
	<u>2.4.14</u>	Knowledge of general guidelines for EOP flowchart use.	3.9	1	
	<u>2.4.21</u>	Knowledge of the parameters and logic used to assess the status of safety functions. <b>(RO)</b>	4.3	1	
	<u>2.4.27</u>	Knowledge of fire in the plant procedure.	3.5	1	
	<u>2.4.31</u>	Knowledge of annunciator alarms and indications and use of the response instructions.	3.4	1	
	<u>2.4.40</u>	Knowledge of the SRO's responsibility in emergency plan implementation.	4.0	1	
	<b>Total</b>			<b>6</b>	
Tier 3 Point Total (SRO)				<b>17</b>	

Plant-Specific Priorities			
System / Topic	Recommended Replacement for...	Reason	Points
056 Condensate / <b>056.K3.01</b> Knowledge of the effect that a loss or malfunction will have on MFW.	K/A retained during original random sample plan development.	Justified for use on exam due to importance of potential loss of Main Feedwater Pumps on low NPSH interlock.	1
Plant-Specific Priority Total: <b>1</b> (limit 10)			

Facility: <b>Point Beach Nuclear Plant</b>				Date of Exam: <b>2/2/02</b>				Exam Level: <b>RO</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	2	2	4				3	4			1	16
	2	4	0	3				3	4			3	17
	3	0	1	1				0	0			1	3
	Tier Totals	6	3	8				6	8			5	36
2. Plant Systems	1	2	2	3	2	2	1	1	2	4	2	2	23
	2	3	1	1	4	2	1	2	3	1	1	1	20
	3	3	0	0	0	0	0	1	1	1	2	0	8
	Tier Totals	8	3	4	6	4	2	4	6	6	5	3	51
3. Generic Knowledge and Abilities				Cat 1		Cat 2		Cat 3		Cat 4		13	
				4		2		3		4			
<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. 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 <math>\pm 1</math> from that specified in the table based on NRC revisions. The final exam must total 100 points.</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 RO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1							Form ES-401-4	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points	
000005 Inoperable/Stuck Control Rod / 1				X			<u>005.AA1.04</u> Ability to operate and/or monitor reactor power and turbine power as they apply to the inoperable/stuck control rod.	3.9	1	
000015/17 RCP Malfunctions / 04	X						<u>015/017.AK1.02</u> Knowledge of operational implications of the consequences of an RCP failure (RCP Malfunction).	3.7	1	
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4						X	<u>2.4.47</u> Ability to diagnose/recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	3.4	1	
000024 Emergency Boration / 1			X				<u>024.AK3.02</u> Knowledge of the reasons for actions contained in the EOP for emergency boration.	4.2	1	
000026 Loss of Component Cooling Water / 8							DESELECTED			
000027 Pressurizer Pressure Control System Malfunction / 3			X				<u>027.AK3.03</u> Knowledge of the reasons for the actions contained in the EOP as they apply to PZR Pressure Control System malfunctions.	3.7	1	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture – Excessive Heat Transfer / 4			X				<u>W/E12.EK3.3</u> Knowledge for the reasons for manipulation of controls required to obtain desired operating results during uncontrolled depressurization of all Steam Generators.	3.5	1	
CE/A11; W/E08 RCS Overcooling – PTS / 4				X			<u>W/E08.EA1.3</u> Ability to operate and/or monitor the desired operating results during abnormal and emergency situations as applied to PTS.	3.6	1	
000051 Loss of Condenser Vacuum / 4					X		<u>051.AA2.02</u> Ability to determine/interpret the conditions requiring a reactor and/or turbine trip as applied to a Loss of Condenser Vacuum.	3.9	1	
000055 Station Blackout / 6			X				<u>055.EK3.02</u> Knowledge of the reasons for actions contained in the EOP for loss of offsite and onsite power (Station Blackout).	4.3	1	
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		<u>057.AA2.19</u> Ability to determine/interpret the plant automatic actions that will occur on a Loss of AC vital electrical instrument bus.	4.0	1	
000062 Loss of Nuclear Service Water / 4					X		<u>062.AA2.02</u> Ability to determine/interpret the cause of possible SWS loss.	2.9	1	
000067 Plant Fire On-site / 9	X						<u>067.AK1.02</u> Knowledge of the operational implications of fire fighting as they apply to a Plant Fire On-Site.	3.1	1	

Emergency and Abnormal Plant Evolutions – Tier 1/Group 1

(CONTINUED)

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000068 (BW/A06) Control Room Evacuation / 8		X					<b>068.AK2.02</b> Knowledge of the interrelations between the Control Room Evacuation and the Reactor Trip System.	3.7	1
000069 (W/E14) Loss of CTMT Integrity / 5				X			<b>069.AA1.01</b> Ability to operate and/or monitor isolation valves, dampers, and electro-pneumatic devices as applied to a Loss of Containment Integrity.	3.5	1
000074 (W/E06&E07) Inadequate Core Cooling / 4					X		<b>074.EA2.06</b> Ability to determine or interpret changes in PZR level due to PZR steam bubble transfer to the RCS during ICC.	4.0	1
BW/E03 Inadequate Subcooling Margin / 4							N/A	N/A	N/A
000076 High Reactor Coolant Activity / 9		X					<b>076.AK2.01</b> Knowledge of the interrelationships between High RCS Activity and process radiation monitors.	2.6	1
BW/A02&A03 Loss of NNI-X/Y / 7							N/A	N/A	N/A
K/A Category Totals:	2	2	4	3	4	1	Group Point Total:		16

ES-401		PWR RO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 2							Form ES-401-4	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points	
000001 Continuous Rod Withdrawal / 1	X						<b>001AK1.05</b> Knowledge of the operational implications of the effects of turbine-reactor power mismatch on rod control as applied to Continuous Rod Withdrawal.	3.5	1	
000003 Dropped Control Rod / 1						X	<b>2.4.11</b> Knowledge of abnormal condition procedures.	3.4	1	
000007 (BW/E02&E10; CE/E02) Reactor Trip – Stabilization – Recovery / 1			X				<b>007.EK3.01</b> Knowledge of reasons for the actions contained in the EOP as applied to a reactor trip.	4.0	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						<b>008.AK1.01</b> Knowledge of the operational implications of the thermodynamics and flow characteristics of open or leaking valves as they apply to a PZR Vapor Space Accident.	3.2	1	
000009 Small Break LOCA / 3							<b>DESELECTED</b>			
000011 Large Break LOCA / 3				X			<b>011.EA1.04</b> Ability to operate/monitor ESF actuation in manual as applied to a Large Break LOCA.	4.4	1	
W/E04 LOCA Outside Containment / 3						X	<b>2.1.7</b> Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	1	
BW/E08; W/E03 LOCA Cooldown/Depress. / 4							<b>DESELECTED</b>			
W/E11 Loss of Emergency Coolant Recirc. / 4					X		<b>W/E11.EA2.2</b> Ability to determine/interpret adherence to appropriate procedures and operations within the limitations in the facilities license and amendments as applied to Loss of Emergency Coolant Recirculation.	3.4	1	
W/E01 & E02 Rediagnosis & SI Termination / 3					X		<b>W/E01.EA2.1</b> Ability to determine/interpret facility conditions and selection of appropriate procedures during abnormal and emergency operation as applied to reactor trip or safety injection rediagnosis.	3.2	1	
000022 Loss of Reactor Coolant Makeup / 2					X		<b>022.AA2.04</b> Ability to determine/interpret how long PZR level can be maintained within limits as applied to a loss of RCP Makeup.	2.9	1	
000025 Loss of RHR System / 4	X						<b>025.AK1.01</b> Knowledge of the operational implications of a Loss of RHR during all modes of operation.	3.9	1	
000029 Anticipated Transient w/o Scram / 1							<b>DESELECTED</b>			
000032 Loss of Source Range NI / 7							<b>DESELECTED</b>			
000033 Loss of Intermediate Range NI / 7			X				<b>033.AK3.01</b> Knowledge of the reasons for termination of startup following loss of intermediate range nuclear instrumentation.	3.2	1	
000037 Steam Generator Tube Leak / 3	X						<b>037.AK1.02</b> Knowledge of the operational implications of leak-rate vs. pressure drop as applied to Steam Generator Tube Leak.	3.5	1	

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 2 (CONTINUED)								Form ES-401-4
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000038 Steam Generator Tube Rupture / 3				X			<b>038.EA1.36</b> Ability to operate/monitor cooldown of RCS to specified temperature as applied to a SGTR.	4.3	1
000054 (CE/E06) Loss of Main Feedwater / 4					X		<b>054.AA2.03</b> Ability to determine/interpret the conditions and reasons for AFW pump startup as applied to a Loss of MFW.	4.1	1
BW/E04; W/E05 Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4						X	<b>2.4.6</b> Knowledge of symptom based EOP mitigation strategies.	3.1	1
000058 Loss of DC Power / 6							<b>DESELECTED</b>		
000059 Accidental Liquid RadWaste Rel. / 9			X				<b>059.AK3.01</b> Knowledge of the reasons for termination of a release of radioactive liquid as applied to an accidental radioactive liquid release.	3.5	1
000060 Accidental Gaseous Radwaste Rel. / 9							<b>DESELECTED</b>		
000061 ARM System Alarms / 7							<b>DESELECTED</b>		
W/E16 High Containment Radiation / 9				X			<b>W/E16.EA1.2</b> Ability to operate and/or monitor operating behavior characteristics of the facility as applied to High Containment Radiation.	2.9	1
CE/E09 Functional Recovery							N/A	N/A	N/A
K/A Category Totals:	4	0	3	3	4	3	Group Point Total:	N/A	17



ES-401		PWR RO Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 3						For ES-401-4	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2						X	<u>2.4.31</u> Knowledge of annunciators, alarms, and indications, and use of the response instructions.	3.3	1
000036 (BW/A08) Fuel Handling Accident / 8			X				<u>036.AK3.02</u> Knowledge of the reasons for the interlocks associated with fuel handling equipment as applied to Fuel Handling Incidents.	2.9	1
000056 Loss of Off-site Power / 6							<b>DESELECTED</b>		
000065 Loss of Instrument Air / 8							<b>DESELECTED</b>		
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							<b>DESELECTED</b>		
W/E15 Containment Flooding / 5		X					<u>W/E15.EK2.2</u> Knowledge of the interrelations between Containment Flooding and the facilities heat removal systems, including primary coolant, emergency coolant, decay heat removal systems, and relations between proper operation of these systems to the operation of the facility.	2.7	1
K/A Category Totals:	0	1	1	0	0	1	Group Point Total:		3

ES-401		PWR RO Examination Outline Plant Systems – Tier 2/Group 1											For ES-401-4	
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>001.A3.03</b> Ability to monitor auto operation of the CRDS, including axial imbalance.	3.6	1
003 Reactor Coolant Pump		X					X					<b>003.K2.01</b> Knowledge of bus power supplies to the RCP's.	3.1	2
												<b>003.A1.05</b> Ability to predict and/or monitor changes in parameters (to prevent exceeding limits) associated with operating the RCPS controls including RCS flow.	3.4	
004 Chemical and Volume Control			X									<b>004.K3.08</b> Knowledge of the effect that a loss or malfunction of the CVCS will have on RCP seal injection.	3.6	2
					X							<b>004.K5.07</b> Knowledge of operational implications of relationship between SUR and reactivity as applied to CVCS.	2.8	
013 Engineering Safety Features Actuation										X		<b>013.A4.03</b> Ability to manually operate and/or monitor ESFAS initiation in the control room.	4.5	2
											X	<b>2.1.31</b> Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	4.2	
015 Nuclear Instrumentation						X						<b>015.K6.04</b> Knowledge of the effect of a loss or malfunction of bistables and logic circuits will have on NIS.	3.1	2
								X				<b>015.A2.05</b> Ability to predict impacts of core void formation on NIS operations and based on these predictions, use procedures to correct, control, or mitigate the consequences.	3.3	
017 In-core Temperature Monitor										X		<b>017.A3.01</b> Ability to monitor automatic operation of the ITM system including indications of normal, natural, and interrupted circulation of the RCS.	3.6	1
022 Containment Cooling		X										<b>022.K2.01</b> Knowledge of power supplies to the containment cooling fans.	3.0	2
								X				<b>022.A2.04</b> Ability to predict the impacts of a loss of service water on the Containment Cooling System and based on these predictions, use procedures to correct, control, or mitigate the consequences.	2.9	

ES-401

PWR RO Examination Outline  
Plant Systems – Tier 2/Group 1  
(CONTINUED)

Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
025 Ice Condenser												N/A	N/A	N/A
056 Condensate			X								X	<u>056.K3.01</u> Knowledge of the effect that a loss or malfunction of the Condensate system will have on MFW. <u>2.1.27</u> Knowledge of system purpose and/or function.	2.4 2.8	2
059 Main Feedwater									X		X	<u>059.A3.06</u> Ability to monitor automatic operation of the MFW system including feedwater isolation. <u>059.A4.11</u> Ability to manually operate and monitor in the control room recovery from auto feedwater isolation.	3.2 3.1	2
061 Auxiliary/Emergency Feedwater	X			X								<u>061.K1.01</u> Knowledge of physical connections and/or cause-effect relationships between AFW and S/G System. <u>061.K4.06</u> Knowledge of AFW design feature(s) and/or interlock(s) which provide for AFW startup permissive.	4.1 4.0	2
068 Liquid Radwaste									X			<u>068.A3.02</u> Ability to monitor automatic operation of Liquid Radwaste System including automatic isolation.	3.6	1
071 Waste Gas Disposal			X	X								<u>071.K3.05</u> Knowledge of the effect that a loss or malfunction of the Waste Gas Disposal System will have on ARM and PRM systems. <u>071.K4.04</u> Knowledge of design feature(s) and/or interlock(s) which provide for isolation of waste gas release tanks.	3.2 2.9	2
072 Area Radiation Monitoring	X				X							<u>072.K1.01</u> Knowledge of the physical connection and/or cause-effect relationships between ARM and plant ventilation systems. <u>072.K5.01</u> Knowledge of the operational implications of radiation theory, including sources, types, units, and effects as they apply to ARM system.	3.1 2.7	2
K/A Category Totals:	2	2	3	2	2	1	1	2	4	2	2	Group Point Total:		23

ES-401		PWR RO Examination Outline Plant Systems – Tier 2/Group 2										For ES-401-4		
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>002.K5.11</b> Knowledge of the operational implications of the relationship between the effects of the primary coolant system and the secondary coolant system as applied to RCS.	4.0	1
006 Emergency Core Cooling				X								<b>006.K4.17</b> Knowledge of ECCS design feature(s) and/or interlocks which provide for SI valve interlock(s).	3.8	1
010 Pressurizer Pressure Control	X											<b>010.K1.02</b> Knowledge of the physical connections and/or cause-effect relationships between PZR PCS and ESFAS.	3.9	1
011 Pressurizer Level Control								X				<b>011.A2.06</b> Ability to predict the impacts of an inadvertent PZR spray actuation on the PZR LCS and based on these predictions, use procedures to correct, control, or mitigate the consequences.	3.7	1
012 Reactor Protection						X						<b>012.K6.06</b> Knowledge of the effect a loss or malfunction of sensors or detectors will have on RPS.	2.7	2
							X					<b>012.A1.01</b> Ability to predict and/or monitor changes in parameters associated with operating the RPS controls including trip setpoint adjustment.	2.9	
014 Rod Position Indication							X					<b>014.A1.03</b> Ability to predict and/or monitor changes in parameters associated with operating the RPIS controls including PDIL.	3.6	1
016 Non-Nuclear Instrumentation												N/A	N/A	N/A
026 Containment Spray				X								<b>026.K4.06</b> Knowledge of CSS design feature(s) and/or interlock(s) which provide for iodine scavenging via the CSS.	2.8	1
029 Containment Purge				X								<b>029.K4.03</b> Knowledge of design feature(s) and/or interlock(s) which provide automatic purge isolation.	3.2	1
033 Spent Fuel Pool Cooling											X	<b>2.4.24</b> Knowledge of loss of cooling water procedures.	3.3	1
035 Steam Generator					X							<b>035.K5.01</b> Knowledge of operational implications on the effect of secondary parameters, pressure, and temperature on reactivity as applied to SGS.	3.4	1

ES-401		PWR RO Examination Outline Plant Systems – Tier 2/Group 2 (CONTINUED)										Form ES-401-4		
E/APE # / Name / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
039 Main and Reheat Steam	X											<b>039.K1.09</b> Knowledge of the physical connections and/or cause-effect relationships between MRSS and RMS.	2.7	1
055 Condenser Air Removal								X				<b>055.A2.01</b> Ability to predict impacts of a loss of circulating water system on CARS and based on those predictions, use procedures to correct, control, or mitigate the consequences.	2.1	1
062 AC Electrical Distribution			X									<b>062.K3.02</b> Knowledge of the effect that a loss or malfunction of the AC Distribution System will have on EDG.	4.1	1
063 DC Electrical Distribution		X										<b>063.K2.01</b> Knowledge of bus power supplies to major DC loads.	2.9	1
064 Emergency Diesel Generator									X			<b>064.A3.07</b> Ability to monitor automatic operation of the EDG system, including load sequencing.	3.6	1
073 Process Radiation Monitoring										X		<b>073.A4.01</b> Ability to manually operate and/or monitor effluent release in the control room.	3.9	1
075 Circulating Water								X				<b>075.A2.02</b> Ability to predict the impact of loss of circulating pumps on the circulating water system and based on these predictions, use procedures to correct, control, or mitigate the consequences.	2.5	1
079 Station Air				X								<b>079.K4.01</b> Knowledge of SAS design feature(s) and/or interlock(s) which provide for cross-connect with IAS.	2.9	1
086 Fire Protection	X											<b>086.K1.03</b> Knowledge of the physical connections and/or cause-effect relationship between the Fire Protection System and the AFW system.	3.4	1
K/A Category Totals:	3	1	1	4	2	1	2	3	1	1	1	Group Point Total:		20

PWR RO Examination Outline Plant Systems – Tier 2/Group 3													For ES-401-4	
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					<u>005.A1.01</u> Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including heatup/cooldown rates.	3.5	1
007 Pressurizer Relief/Quench Tank	X											<u>007.K1.01</u> Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the Containment.	2.9	1
008 Component Cooling Water								X				<u>008.A2.01</u> Ability to predict the impacts of a loss of CCW pump on the CCWS and based on these predictions, use procedures to correct, control, or mitigate the consequences.	3.3	1
027 Containment Iodine Removal												N/A	N/A	N/A
028 Hydrogen Recombiner and Purge Control												DESELECTED		
034 Fuel Handling Equipment												DESELECTED		
041 Steam Dump/Turbine Bypass Control										X		<u>041.A4.04</u> Ability to manually operate and/or monitor pressure mode in the control room.	2.7	1
045 Main Turbine Generator	X											<u>045.K1.20</u> Knowledge of the physical connections and/or cause-effect relationships between MT/G system and the protection system.	3.4	1
076 Service Water										X		<u>076.A4.04</u> Ability to manually operate and/or monitor emergency heat loads in the control room.	3.5	1
078 Instrument Air	X											<u>078.K1.05</u> Knowledge of the physical connections and/or cause-effect relationships between the IAS and MSIV air.	3.4	1
103 Containment									X			<u>103.A3.01</u> Ability to monitor automatic operation of the containment system, including containment isolation.	3.9	1
K/A Category Totals:	3	0	0	0	0	0	1	1	1	2	0	Group Point Total		8

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
055 Condenser Air Removal / <b>055.A2.01</b> Ability to predict impacts of a loss of circulating water system on CARS and based on those predictions, use procedures to correct, control, or mitigate the consequences.	K/A retained during original random sample plan development.	Justified for use on exam due to recent Circ Water events at the facility.	1
056 Condensate / <b>056.K3.01</b> Knowledge of the effect that a loss or malfunction will have on MFW.	K/A retained during original random sample plan development.	Justified for use on exam due to importance of potential loss of Main Feedwater Pumps on low NPSH interlock.	1
Plant-Specific Priority Total: 2 (limit 10)			

Facility: <b>PBNP</b>		Date of Exam: <b>2/2/02</b>	Exam Level: <b>RO</b>	
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	<u>2.1.7</u>	Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	1
	<u>2.1.10</u>	Knowledge of conditions and limitations in the facility license.	2.7	1
	<u>2.1.20</u>	Ability to execute procedure steps.	4.3	1
	<u>2.1.31</u>	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	4.2	1
	<b>Total</b>			<b>4</b>
Equipment Control	<u>2.2.22</u>	Knowledge of limiting conditions for operations and safety limits.	3.4	1
	<u>2.2.30</u>	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communications with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation.	3.5	1
	<b>Total</b>			<b>2</b>
Radiation Control	<u>2.3.1</u>	Knowledge of 10 CFR 20 and related facility radiation control requirements.	2.6	1
	<u>2.3.2</u>	Knowledge of facility ALARA program.	2.5	1
	<u>2.3.10</u>	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
	<b>Total</b>			<b>3</b>
Emergency Procedures/ Plan	<u>2.4.2</u>	Knowledge of system setpoints, interlocks and automatic actions associated with EOP entry conditions.	3.9	1
	<u>2.4.5</u>	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	2.9	1
	<u>2.4.20</u>	Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1
	<u>2.4.21</u>	Knowledge of the parameters and logic used to assess the status of safety functions.	3.7	1
	<b>Total</b>			<b>4</b>
Tier 3 Point Total (RO)				<b>13</b>



Tier/Group	Randomly Selected K/A	Reason for Rejection
1/1 (RO)	005.AA1.03	Metroscope use is N/A for PBNP because none exists.
1/1 (RO)	051.AA1	All K/A's in this category were 2.5 or less, re-sampled K3 and A2.
1/1 (RO)	055.EK2	All K/A's in this category were less than 2.5, re-sampled all other categories.
1/1 (RO)	057.AK1	No K/A's in this category, re-sampled all other categories except AK2 which had no K/A's greater than 2.5.
1/1 (RO)	076.AK2.06	K/A less than 2.5 and not much applicability. Reselected the only K/A in this category greater than 2.5.
1/2 (RO)	001.AK1.15	K/A less than 2.5. reselected within this category.
1/2 (RO)	038.EA1.28	N/A to PBNP because no such interlock between MSIV and bypasses exists.
2/1 (RO)	003.K2.05	K/A less than 2.5. reselected within category between the two K/A's 2.5 or greater.
2/1 (RO)	015.K6.08	K/A less than 2.5 and also N/A to PBNP, reselected from within this category.
2/1 (RO)	022.K6	All K/A's in this category were less than 2.5, re-sampled all other categories.
2/1 (RO)	059.A4.04	K/A less than 2.5 and N/A to PBNP due to MFWP's do not have an overspeed trip, reselected from within this category.
2/1 (RO)	071.K3.01	K/A less than 2.5, reselected from those K/As in this category K/As with greater than 2.5 value.
2/2 (RO)	029.K6	All K/A's in this category were less than 2.5, re-sampled other categories containing K/As greater than 2.5.
2/2 (RO)	035.K5.05	K/A less than 2.5, reselected within category between the two K/A's 2.5 or greater.
2/2 (RO)	075.A2.10	K/A less than 2.5 and N/A to PBNP. Reselected from those K/A's in this category that were 2.5 or greater.
2/2 (RO)	079.K5	All K/A's in this category were less than 2.5, re-sampled all other categories with K/As greater than 2.5.
2/3 (RO)	103.K6	All K/A's in this category were less than 2.5, re-sampled all other categories with K/As greater than 2.5.
3 (RO)	2.1.6	K/A less than 2.5 and N/A for RO role.
3 (RO)	2.2.5	K/A less than 2.5 and N/A for RO role.
3 (RO)	2.2.14	K/A less than 2.5 and N/A for RO role.
3 (RO)	2.2.29	K/A less than 2.5 and N/A for RO role.
3 (RO)	2.3.7	K/A less than 2.5 and N/A for RO role.
2/1 (SRO)	026.A2.02	N/A to PBNP since no automatic sump transfer capability exists, reselected within this category.
2/3 (RO)	007.K5.02	K/A determined to be N/A to PBNP, re-sampled other categories with K/As greater than 2.5.