

BWR RO EXAM OUTLINE ES-401-2**COUNT MATRIX{PRIVATE }**

Summarizing Counts by K/A Group
for
BWR - Reactor Operator

	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	SG	Total
E/APE # - T1 Gp 1	3	3	4				2	1			0	13
E/APE # - T1 Gp 2	4	3	3				4	3			2	19
E/APE # - T1 Gp 3	1	1	0				2	0			0	4
Tier Totals	8	7	7				8	4			2	36
Plant Systems / T2 Gp 1	2	3	3	3	3	2	2	3	3	2	2	28
Plant Systems / T2 Gp 2	2	2	2	2	2	2	2	1	2	2	0	19
Plant Systems / T2 Gp 3	1	0	0	1	0	0	1	1	0	0	0	4
Tier Totals	5	5	5	6	5	4	5	5	5	4	2	51
Generic K/As / T3	CAT 1 - 3			CAT 2 - 3		CAT 3 - 4		CAT 4 - 3				13
Model Total												100

BWR RO EXAM OUTLINE ES-401-2**EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP I**

BWR - Reactor Operator

Target: 13%

Actual: 13%

{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
1	295005 / Main Turbine Trip / 3		x										AK2.08 – AC electrical distribution WNP-2LER 90-031	3.3	1
2	295006 / SCRAM / 1	x											AK1.02 – Shutdown Margin	3.7	1
3	295006 / SCRAM / 1			x									AK3.06 – Recirculation pump speed reduction	3.3	1
4	295007 / High Reactor Pressure / 3			x									AK3.04 – Safety/relief valve operation	4.1	1
5	295010 / High Drywell Pressure / 5							x					AA1.02 – Drywell floor and equipment drain sumps	3.6	1
6	295014 / Inadvertent Reactivity Addition / 1								x				AA2.03 – Cause of Reactivity Addition WNP-2 LER 86-004	4.3	1
7	295025 / High Reactor Pressure / 3		x										EK2.11 – Reactor Water Level	3.6	1
8	295025 / High Reactor Pressure / 3			x									Ek3.07 – RRC initiation	3.7	1
9	295031 / Reactor Low Water Level / 2			x									EK3.05 – Emergency Depressurization	4.3	1
10	295037 / Scram							x					EA1.07 – RMCS	4.0	1

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
BWR RO EXAM OUTLINE ES-401-2

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
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[illegible]

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{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
11	295037 / Scram Condition Present and Reactor Power Above APRM dwncsl or unknown / 1	x											EK1.03 – Boron effects on reactor power (SBLC)	4.4	1
12 {P R I V A T E }	500000 / High Containment Hydrogen Concentration / 5	x											EK1.01 – Containment integrity	3.9	1
13	500000 / High Containment Hydrogen Concentration / 5		x										EK2.09 – Drywell nitrogen purge system	3.3	1
Category Point Totals:		3	3	4				2	1			0	Group Point Totals:		13

BWR RO EXAM OUTLINE ES-401-2**EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP II**

BWR - Reactor Operator

Target: 19%

Actual: 19%

{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
1	295001 / partial or Complete Loss of Forced Core Flow Circulation / 1							x					AA1.03 – RMCS	2.7	1
2	295002 / Loss of Main Condenser Vacuum / 3			x									AK3.01 – Reactor SCRAM	3.8	1
3	295003 / Partial or Complete Loss of AC Power / 6							x					AA1.03 – System necessary to assure safe plant shutdown WNP-2 LER 96-002	4.4	1
4	295003 / Partial or Complete Loss of AC Power / 6								x				AA2.05 – Whether a partial or complete loss of AC power has occurred	3.9	1
5	295008 / High Reactor Water Level / 2											x	2.4.10 – Knowledge of annunciator response procedures	3.0	1
6	295013 / High Suppression Pool Temperature / 5							x					AA1.01 – Suppression Pool Cooling	3.9	1
7	295013 / High Suppression Pool											x	2.4.32 – Knowledge of operator response to loss of all annunciators	3.3	1

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
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[illegible]

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{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
8	295016 / Control Room Abandonment / 7		x										AK2.02 – Local Control Stations	4.1	1
9	295018 / Partial or complete loss of Component Cooling Water / 8							x					AA1.01 – Backup Systems	3.4	1
10 {P R I V A T E }	295019 / Partial or Complete Loss of Instrument Air / 8		x										AK2.11 – Radwaste	2.6	1
11	295019 / Partial or Complete Loss of Instrument Air / 8			x									AK3.03 – Service air isolations SOER 8801	3.2	1
12	295020 – Inadvertent Containment Isolation / 5	x											AK1.02 – Power/Reactivity Control	3.8	1
13	295028 – High Drywell Temperature / 5			x									EK3.04 – Increased drywell cooling	3.8	1

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14	295028 – High Drywell Temperature / 5							x				EA2.03 – Reactor Water Level	3.7	1	
15	295030 / Low Suppression Pool Water Level / 5		x									EK2.03 – LPCS	3.9	1	
{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
16	295033 / High Sec Cont Area Radiation Levels / 9	x										EK1.02 – Personnel Protection	4.2	1	
17	295038 / High Offsite Release Rate / 9	x										EK1.02 – Protection of the general public	4.4	1	
18	600000 / Plant Fire On Site / 8	x										AK1.01 – Fire Classifications by Type	2.8	1	
19	600000 / Plant Fire On Site / 8								x			AA2.16 – Vital equipment and control systems to be maintained and operated during a fire	3.0	1	
Category Point Totals:		4	3	3				4	3			2	Group point totals: 19		19

BWR RO EXAM OUTLINE ES-401-2**PLANT SYSTEMS - TIER 1 GROUP III**

BWR - Reactor Operator

Target: 4%

Actual: 4%

{ P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
1	295023 / Refueling Accidents / 8							x					AA1.03 – Fuel handling equipment	3.6	1
2	295032 / High Secondary Containment Area Temperature / 5	x											EK1.01 – Personnel Protection	3.6	1
3	295035 / Secondary Containment High Differential Pressure		x										EK2.02 – SBT	3.6	1
4	295036 / Secondary Cont High Sump/Area Water Level / 5							x					EA1.04 – Radiation Monitoring	3.4	1
Category Point Totals:		1	1	0				2	0			0	Group Point Totals: 4		4

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PLANT SYSTEMS - TIER 2 GROUP I

BWR - Reactor Operator

Target: 28%

Actual: 28%

{P R I V A T E }	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 TOPICS	IMP	POINTS
1	201001 / Control Rod Drive Hydraulic System								x				A2.12 – High cooling water	2.8	1
2	203000 / RHR/LPCI: Injection Mode		x										K2.01 - Pumps	3.5	1
3	203000 / RHR/LPCI: Injection Mode			x									K3.03 – Automatic Depressurization logic	4.2	1
4	209001 – Low Pressure Core Spray System								x				A2.07 – Loss of room cooling	2.8	1
5	209001 – Low Pressure Core Spray System					x							K5.04 – Heat removal (transfer) mechanisms	2.8	1
6	209002 / High Pressure Core Spray System										x		A4.09 – Suppression Pool level	3.4	1
7	209002 / High											x	2.1.33 – Ability to recognize indications for system operating	3.4	1

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	Pressure Core Spray System												parameters which are entry-level conditions for technical specifications. WNP-2 LER 91-015		
8	215004 / Source Range Monitor Sys					x							K5.03 – Changing detector position	2.8	1
{P R I V A T E }	SYSTEM #/ NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
9	211000 – Standby Liquid Control System							x					A1.06 – Flow indication	3.9	1
10	212000 – Reactor Protection System			x									K3.06 – Scram air header solenoid operated valves	4.1	1
11	215004 – Source Range Monitor System										x		A4.01 – SRM count rate and period	3.8	1
{P R I V A T E } 1 2	215005 – Average Power Range Monitor/Local Power Range Monitor System									x			A3.01 – Four rod display	3.5	1
13	217000 / Reactor core Isolation Cooling System											x	2.1.33 – Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1

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14	217000 / Reactor core Isolation Cooling System		x										K2.03 – RCIC flow controller	2.7	1
15	218000 / Automatic Depressurization System		x										K2.01 – ADS Logic	3.3	1
16	218000 / Automatic Depressurization System						x						K6.04 – Air supply to the ADS valves	3.6	1

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{P R I V A T E }	SYSTEM #/ NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
17	223001 / Primary Containment System and Auxiliaries					x							K5.12 – Hydrogen concentration measurement WNP-2 IPE	2.8	1
18	223001 / Primary Containment System and Auxiliaries							x					A1.06 – Oxygen concentration	3.3	1
19	223002 / Primary Containment Isolation System/Nuclear Steam Supply Shut-Off			x									K3.17 – Reactor Vessel Head Spray	2.9	1
20	223002 / Primary Containment Isolation System/Nuclear Steam Supply Shut-Off						x						K6.08 – Reactor Protection System	3.7	1
21	239002 / Relief/Safety Valves	x											K1.05 – Plant Air Systems	3.1	1
22	241000	x											K1.06 – Bypass Valves	3.9	1

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	/Reactor/Turbine Pressure Regulating System															
{P R I V A T E }	SYSTEM #/ NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS	
23	241000 /Reactor/Turbine Pressure Regulating System				x								K4.13 – Turbine Trip Testing WNP-2 LER 95-002	3.0	1	
24	259001 / Reactor Feedwater System				x								K4.02 – Feedwater heating	2.8	1	
25	259002 / Reactor Water Level Control System				x								K4.06 – Control Signal Failure	3.1	1	
26	261000 / Standby Gas Treatment System								x				A2.01 – Low system flow	3.1	1	
27	261000 / Standby Gas Treatment System									x			A3.02 – Fan Start	3.1	1	
28	264000 / Emergency Generators									x			A3.01 – Automatic starting of compressor and emergency generator	3.0	1	
Category Point Totals:		2	3	3	3	3	2	2	3	3	2	2	Group Point Total: 28		28	

Facility: WNP-2

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
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Exam date: October 23, 2000

bold face indicates K/As common to both RO and SRO
rooutr5

BWR RO EXAM OUTLINE ES-401-2**PLANT SYSTEMS - TIER 2 GROUP II**

BWR - Reactor Operator

Target: 19%

Actual: 19%

{P R I V A T E }	SYSTEM #/ NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
1	201004 / Rod Sequence Control System			x									K3.01 – Reactor manual control	3.3	1
2	202001 / Recirculation System							x					A1.04 – Reactor water level	3.3	1
3	202001 / Recirculation System		x										K2.01 – Recirculation Pumps	3.2	1
4	204000 / Reactor Water Cleanup System									x			A3.03 – Response to system isolations	3.6	1
5	204000 / Reactor Water Cleanup System								x				A2.08 – RWCU pump seal failure	3.1	1
6	205000 / Shutdown Cooling System (RHR Shutdown Cooling Mode)						x						K6.02 – DC electrical power	2.9	1
7	214000 / Rod Position Information System				x								K4.02 – Thermocouple	2.5	1
8	215002 / Rod Block Monitor System					x							K5.01 – Trip reference selection	2.8	1

Knowledge and Ability Record Form
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9	219000 / RHR/LPCI: Suppression Pool Cooling Mode											x		A4.07 – System Flow	3.5	1
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{P R I V A T E }	SYSTEM #/ NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
10 {P R I V A T E }	226001 – RHR/LPCI: Containment Spray System Mode										x		A4.02 – Suction Valves	3.1	1
11	230000 / RHR/LPCI: Suppression Pool Spray Mode									x			A3.01 – Valve operation	3.3	1
12	239001 / Main and Reheat Steam System							x					A1.02 – Main steam temperature	2.6	1
13	245000 / Main Turbine Generator and Auxiliary Systems					x							K5.02 – Turbine operation and limitations	2.8	1
14	256000 / Reactor Condensate System	x											K1.13 – Reactor water level	3.5	1
15	262001 – AC Electrical Distribution	x											K1.06 – Alternate Shutdown System WNP-2 IPE	3.9	1
16	262001 – AC Electrical Distribution						x						K6.02 – Off-Site Power WNP-2 IPE	3.9	1

Facility: WNP-2

Knowledge and Ability Record Form
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17	290001 – Secondary Containment				x									K4.03 – Fluid leakage collection	2.9	1
18	300000 / Instrument Air System		x											K2.01 – Instrument air compressor	2.8	1

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{P R I V A T E }	SYSTEM #/ NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
19	400000 / Component Cooling Water System			x									K3.01 – Loads cooled by CCWS	3.3	1
Category Point Totals:		2	2	2	2	2	2	2	1	2	2	0	Group point totals: 19		19

Knowledge and Ability Record Form
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PLANT SYSTEMS - TIER 2 GROUP III

BWR - Reactor Operator

Target: 4%

Actual: 4%

{P R I V A T E }	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 TOPICS	IMP	POINTS
1	215001 / Traversing In-Core Probe				x								K4.01 – Primary containment isolation	3.5	1
2	233000 / Fuel Pool Cooling and Clean-up							x					A1.06 – System flow	2.5	1
3	239003 / MSIV Leakage Control System	x											K1.01 – Main Steam System	3.4	1
4	268000 / Radwaste								x				A2.01 – System rupture	2.9	1
	Category Point Totals:	1	0	0	1	0	0	1	1	0	0	0	Group point totals: 4		4

BWR RO EXAM OUTLINE ES-401-2**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - Reactor Operator

Target: 13%

Actual: 13%

{P R I V A T E }	Category	K/A	TOPICS	IMP	POINTS
1	Conduct	2.1.32	Ability to explain and apply system limits and precautions	3.8	1
2	of	2.1.29	Knowledge of how to conduct and verify valve lineups	3.3	1
3	Operations	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status	3.0	1
4	Equipment Control	2.2.23	Ability to track limiting conditions for operations	3.8	1
5		2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. WNP-2 LER 84-108	4.0	1
6		2.2.22	Knowledge of limiting conditions for operations and safety limits WNP-2 IPE	4.1	1
7	Radiation Control	2.3.9	Knowledge of the process for performing a containment purge WNP-2 LER 90-022	3.4	1
8		2.3.11	Ability to control radiation releases	3.2	1
9		2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure	2.9	1
10		2.3.2	Knowledge of the facility ALARA program	2.5	1
11	Emergency Proc.	2.4.15	Knowledge of communications procedures associated with EOP implementation	3.5	1
12		2.4.11	Knowledge of abnormal condition procedures	3.6	1

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13	Plan	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm	3.6	1
		Group point totals: 13			13

Facility: WNP-2

Knowledge and Ability Record Form
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Exam date: October 23, 2000

CHANGES MADE TO THIS REV.

Admin changes for spelling etc.

Added references to industry events.

Changed references to Columbia back to WNP-2

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

COUNT MATRIX{PRIVATE }

Summarizing Counts by K/A Group
 for
 BWR - Senior Reactor Operator

	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Total
E/APE # - T1 Gp 1	5	4	4				4	7			2	26
E/APE # - T1 Gp 2	3	2	3				3	5			1	17
Tier Totals	8	6	7				7	12			3	43
Plant Systems / T2 Gp 1	2	2	2	2	2	2	2	2	2	2	3	23
Plant Systems / T2 Gp 2	1	2	1	1	1	1	1	1	2	0	2	13
Plant Systems / T2 Gp 3	1	0	0	1	0	0	1	0	0	0	1	4
Tier Totals	4	4	3	4	3	3	4	3	4	2	6	40
Generic K/As / T3	CAT 1 - 4 CAT 2 - 5 CAT 3 - 4 CAT 4 - 4											17
Model Total												100

BWR SRO EXAM OUTLINE ES-401-1**EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP I**

BWR - Senior Reactor Operator

Target: 26%

Actual: 26%

{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
1	295003 / Partial or Complete Loss of AC Power / 6											x	2.4.29 – Knowledge of the emergency plan SRO 10 CFR 55.43. WNP-2 IPE	4.0	1
2	295003 / Partial or Complete Loss of AC Power / 6							x					AA1.03 – System necessary to assure safe plant shutdown WNP-2 LER 96-002	4.4	1
3	295006 / SCRAM / 1	x											AK1.02 – Shutdown Margin	3.7	1
4	295006 / SCRAM / 1			x									AK3.06 – Recirculation pump speed reduction	3.3	1
5	295007 / High Reactor Pressure / 3								x				AA2.02 – Reactor Power SRO 10 CFR 55.43	4.1	1
6	295007 / High Reactor Pressure / 3			x									AK3.04 – Safety/relief valve operation	4.1	1
7	295010 / High Drywell Pressure / 5											x	2.1.32 – Ability to explain and apply system limits and precautions SRO 10 CFR 55.43	3.8	1
8	295013 / High Suppression Pool Temperature / 5							x					AA1.01 – Suppression Pool Cooling	3.9	1
9	295014 / Inadvertent								x				AA2.03 – Cause of Reactivity Addition SRO 10 CFR 55.43	4.3	1

Facility: WNP-2

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	Reactivity Addition / 1											WNP-2 LER 86-004		
10	295015 / Incomplete Scram / 1							x				AA2.02 – Control Rod Position SRO 10 CFR 55.43	4.2	1

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{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
11	295016 / Control Room Abandonment / 7		x										AK2.02 – Local Control Stations	4.1	1
12	295023 / Refueling Accidents / 8							x					AA1.03 – Fuel handling equipment	3.6	1
13	295023 / Refueling Accidents / 8								x				AA2.05 – Entry Conditions of the emergency plan SRO 10 CFR 55.43	4.6	
14	295025 / High Reactor Pressure / 3		x										EK2.11 – Reactor Water Level	3.6	1
15	295025 / High Reactor Pressure / 3			x									EK3.07 – RRC initiation	3.7	1
16	295026 / Suppression Pool High Water Temperature / 5								x				EA2.03 – Reactor Pressure SRO 10 CFR 55.43	4.0	1
17	295030 / Low Suppression Pool Water Level / 5	x											EK1.02 – Pump NPSH	3.8	1
18	295030 / Low Suppression Pool Water Level / 5		x										EK2.03 – LPCS	3.9	1
19	295031 / Reactor Low Water Level / 2			x									EK3.05 – Emergency Depressurization	4.3	1

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20	295031 / Reactor Low Water Level / 2						x			EA2.04 – Adequate Core Cooling SRO 10 CFR 55.43	4.8	1
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{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
21	295037 / Scram Condition Present and Reactor Power Above APRM dwncsl or unknown / 1	x											EK1.03 – Boron effects on reactor power (SBLC)	4.4	1
22	295037 / Scram Condition Present and Reactor Power Above APRM dwncsl or unknown / 1							x					EA1.07 – RMCS	4.0	1
23	295038 / High Offsite Release Rate / 9								x				EA2.03 – Radiation Levels SRO 10 CFR 55.43	4.3	1
24	295038 / High Offsite Release Rate / 9	x											EK1.02 – Protection of the general public	4.4	1
25	500000 / High Containment Hydrogen Concentration / 5	x											EK1.01 – Containment integrity	3.9	1
26	500000 / High Containment Hydrogen Concentration / 5		x										EK2.09 – Drywell nitrogen purge system	3.3	1
Category Point Totals:		5	4	4				4	7			2	Group Point Totals: 26		26

BWR SRO EXAM OUTLINE ES-401-1**EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP II**

BWR - Senior Reactor Operator

Target: 17%

Actual: 17%

{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
1	295001 / partial or Complete Loss of Forced Core Flow Circulation / 1							x					AA1.03 – RMCS	2.7	1
2	295002 / Loss of Main Condenser Vacuum / 3								x				AA2.04 – Offgas System Flow SRO 10 CFR 55.43	2.9	1
3	295002 / Loss of Main Condenser Vacuum / 3			x									AK3.01 – Reactor SCRAM	3.8	1
4	295004 / Partial or Complete Loss of DC Power / 6								x				AA2.02 – Extent of partial or complete loss of DC power SRO 10 CFR 55.43	3.9	1
5	295004 / Partial or Complete Loss of DC Power / 6											x	2.4.8 – Knowledge of how the event-based emergency/abnormal operation procedure are used in conjunction with the symptom-based EOPs SRO 10 CFR 55.43	3.7	1
6	295005 / Main Turbine Trip / 3		x										AK2.08 – AC electrical distribution WNP-2 LER 90-031	3.3	1
7	295012 / High Drywell Temperature / 5								x				AA2.01 – Drywell Temperature SRO 10 CFR 55.43	3.9	1

BWR SRO EXAM OUTLINE ES-401-1

8	295018 / Partial or complete loss of Component Cooling Water / 8							x					AA1.01 – Backup Systems	3.4	1
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{P R I V A T E }	E/APE # - NAME/SAFETY FUNCTION	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
9	295019 / Partial or Complete Loss of Instrument Air / 8		x										AK2.11 – Radwaste	2.6	1
10	295019 / Partial or Complete Loss of Instrument Air / 8			x									AK3.03 – Service air isolations SOER 8801	3.2	1
11	295020 – Inadvertent Containment Isolation / 5	x											AK1.02 – Power/Reactivity Control	3.8	1
12	295028 – High Drywell Temperature / 5			x									EK3.04 – Increased drywell cooling	3.8	1
13	295033 / High Sec Cont Area Radiation Levels / 9	x											EK1.02 – Personnel Protection	4.2	1
14	295033 / High Sec Cont Area Radiation Levels/9								x				EA2.01 – Area radiation levels SRO 10 CFR 55.43	3.9	1

BWR SRO EXAM OUTLINE ES-401-1

15	295034 / Secondary Cont Ventilation High Radiation / 9							x				EA2.01 – Ventilation radiation levels SRO 10 CFR 55.43	4.2	1
16	295036 / Secondary Cont High Sump/Area Water Level / 5							x				EA1.04 – Radiation Monitoring	3.4	1
17	600000 / Plant Fire On Site / 8	x										AK1.01 – Fire Classifications by Type	2.8	1
Category Point Totals:		3	2	3				3	5			1	Group point totals: 17	17

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

PLANT SYSTEMS - TIER 2 GROUP I

BWR - Senior Reactor Operator

Target: 23%

Actual: 23%

{ P R I V A T E }	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 TOPICS	IMP	POINTS
1	203000 / RHR/LPCI: Injection Mode		x										K2.01 - Pumps	3.5	1
2	209001 – Low Pressure Core Spray System								x				A2.07 – Loss of room cooling	2.8	1
3	211000 – Standby Liquid Control System							x					A1.06 – Flow indication	3.9	1
4	212000 – Reactor Protection System			x									K3.06 – Scram air header solenoid operated valves	4.1	1
5	215004 – Source Range Monitor System										x		A4.01 – SRM count rate and period	3.8	1
6	215005 – Average Power Range Monitor/Local Power Range Monitor System											x	2.1.32 – Ability to explain and apply system limits and precautions SRO 10 CFR 55.43	3.8	1
7	215005 – Average Power Range Monitor/Local Power									x			A3.01 – Four rod display	3.5	1

Knowledge and Ability Record Form
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BWR SRO EXAM OUTLINE ES-401-1

	Range Monitor System																		
8	217000 – Reactor Core Isolation Cooling System												x	2.1.7 – Ability to evaluate plant performance	4.4	1			

BWR SRO EXAM OUTLINE ES-401-1

{P R I V A T E }	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 TOPICS	IMP	POINTS
9	218000 – Automatic Depressurization System		x										K2.01 – ADS Logic	3.3	1
10	223001 – Primary Containment System and Auxiliaries					x							K5.12 – Hydrogen concentration measurement WNP-2 IPE	2.8	1
11	223001 – Primary Containment System and Auxiliaries							x					A1.06 – Oxygen concentration	3.3	1
12	223002 – Primary Containment Isolation System/Nuclear Steam Supply Shut- Off			x									K3.17 – Reactor Vessel Head Spray	2.9	1
13	223002 – Primary Containment Isolation System/Nuclear Steam Supply Shut-						x						K6.08 – Reactor Protection System	3.7	1

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

[illegible]

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

20	262001 – AC Electrical Distribution	x											K1.06 – Alternate Shutdown System WNP-2 IPE	3.9	1
21	262001 – AC Electrical Distribution						x						K6.02 – Off-Site Power WNP-2 IPE	3.9	1
22	290001 – Secondary Containment											x	2.4.28 – Knowledge of procedures relation to emergency response to sabotage SRO 10 CFR 55.43	3.3	1

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

{P R I V A T E }	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 TOPICS	IMP	POINTS
23	290001 – Secondary Containment				x								K4.03 – Fluid leakage collection	2.9	1
Category Point Totals:		2	2	2	2	2	2	2	2	2	2	3	Group Point Total: 23		23

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

PLANT SYSTEMS - TIER 2 GROUP II

BWR - Senior Reactor Operator

Target: 13%

Actual: 13%

{P R I V A T E }	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 TOPICS	IMP	POINTS
1	202001 / Recirculation System							x					A1.04 – Reactor water level	3.3	1
2	202001 / Recirculation System		x										K2.01 – Recirculation Pumps	3.2	1
3	204000 / Reactor Water Cleanup System									x			A3.03 – Response to system isolations	3.6	1
4	204000 / Reactor Water Cleanup System								x				A2.08 – RWCU pump seal failure	3.1	1
5	205000 / Shutdown Cooling System (RHR Shutdown Cooling Mode)						x						K6.02 – DC electrical power	2.9	1
6	214000 / Rod Position Information System				x								K4.02 – Thermocouple	2.5	1
7	215002 / Rod Block Monitor System					x							K5.01 – Trip reference selection	2.8	1
8	230000 / RHR/LPCI: Suppression Pool Spray									x			A3.01 – Valve operation	3.3	1

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

	Mode																		
9	239003 / MSIV Leakage Control System	x															K1.01 – Main Steam System	3.4	1

BWR SRO EXAM OUTLINE ES-401-1

{P R I V A T E }	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 TOPICS	IMP	POINTS
10	272000 / Radiation Monitoring System											x	2.3.2 – Knowledge of the facility ALARA Program SRO 10 CFR 55.43	2.9	1
11	290003 / Control Room HVAC											x	2.2.11 - Knowledge of the process for controlling temporary changes SRO 10 CFR 55.43	3.4	1
12	300000 / Instrument Air System		x										K2.01 – Instrument air compressor	2.8	1
13	400000 / Component Cooling Water System			x									K3.01 – Loads cooled by CCWS	3.3	1
Category Point Totals:		1	2	1	1	1	1	1	1	2	0	2	Group point totals: 13		13

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

PLANT SYSTEMS - TIER 2 GROUP III

BWR - Senior Reactor Operator

Target: 4%

Actual: 4%

{P R I V A T E }	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 TOPICS	IMP	POINTS
1	215001 / Traversing In-Core Probe				x								K4.01 – Primary containment isolation	3.5	1
2	239001 / Main and Reheat Steam System							x					A1.02 – Main steam temperature	2.6	1
3	256000 / Reactor Condensate System	x											K1.13 – Reactor water level	3.5	1
4	290002 / Reactor Vessel Internals											x	2.4.48 – Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions SRO 10 CFR 55.43	3.8	1
		1			1			1				1	Group Point Total: 4		4

BWR SRO EXAM OUTLINE ES-401-1**PLANT-WIDE GENERIC RESPONSIBILITIES TIER 3**

BWR - Senior Reactor Operator

Target: 17%

Actual: 17%

{PR IVA TE }	Category	K/A	TOPICS	IMP	POINTS
1	Conduct of Operations	2.1.5	Ability to locate en and use procedure and directives related to shift staffing and activities SRO 10 CFR 55.43	3.4	1
2		2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data SRO 10 CFR 55.43	3.1	1
3		2.1.32	Ability to explain and apply system limits and precautions SRO 10 CFR 55.43	3.8	1
4		2.1.14	Knowledge of system status criteria which require the notification of plant personnel SRO 10 CFR 55.43	3.3	1
5		2.1.4	Knowledge of Shift Staffing requirements SRO 10 CFR 55.43	3.4	1
6	Equipment Control	2.2.27	Knowledge of the refueling process SRO 10 CFR 55.43	3.5	1
7		2.2.22	Knowledge of limiting conditions for operations and safety limits SRO 10 CFR 55.43 - WNP-2 IPE	4.1	1
8		2.2.5	Knowledge of the process for making changes in the facility as described in the safety analysis report SRO 10 CFR 55.43	2.7	1
9		2.2.11	Knowledge of the process for controlling temporary changes SRO 10 CFR 55.43	3.4	1
10		2.2.23	Ability to track limiting conditions for operations SRO 10 CFR 55.43	3.8	1
11	Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized SRO 10 CFR 55.43	3.1	1
12		2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g. waste disposal and handling systems) SRO 10 CFR 55.43	2.9	1
13		2.3.9	Knowledge of the process for performing a containment purge SRO 10 CFR 55.43	3.4	1

Facility: WNP-2

Knowledge and Ability Record Form
ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

Exam date: October 2000

		WNP-2 LER 90-022		
14	2.3.11	Ability to control radiation releases	3.2	1

Knowledge and Ability Record Form
 ref: NUREG - 1021 rev 8
BWR SRO EXAM OUTLINE ES-401-1

{P RI VA TE }	Category	K/A	TOPICS	IMP	POINTS
15	Emergency	2.4.10	Knowledge of annunciator response procedures SRO 10 CFR 55.43	3.1	1
16	Procedures	2.4.11	Knowledge of abnormal condition procedures SRO 10 CFR 55.43	3.6	1
17	Plan	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm SRO 10 CFR 55.43	3.6	1
			Group point totals: 17		17

CHANGES MADE TO THIS REV.

- Deleted T2, GP2, #4, 211000K5.02 Chugging – This concept no longer applies to WNP-2 due to design change. SLC now into HPCS versus below core plate area.
- Unbolded T3, #16 – no longer on both exams.

ADMINISTRATIVE TOPICS OUTLINE FORM ES-301-1

Facility: WNP-2 Date of examination: 10/23/00 Examination level: SRO		
Administrative Topic/Subject Description		Describe the method of evaluation: 1. ONE admin JPM, OR 2. TWO Administrative questions
A.1	Mode Changes JPM	2.1.12 – Ability to apply Tech Specs for a system. JPM – Determination of Mode Change – Given a set of plant conditions with equipment out of service, determine if Mode change is allowed. Browns Ferry OE 11029
	Shift Staffing requirements 2 questions	2.1.4 – Knowledge of Shift Staffing requirements. 1 st question – Given plant conditions and a list of personnel, can the oncoming shift relieve the outgoing shift and justifications for the decision. 2 nd question – Who is allowed to operate controls in the control room during power operations.
A.2	Use of P+IDs 2 questions	2.1.24 – Ability to obtain and interpret station electrical and mechanical drawings. 1 st question: Given a scenario with SM-7 powered from the Startup Transformer, using EWDs explain why LPCS-P-1 will not start by arm and depress WNP-2 PER 298-1094 2 nd question: Given a scenario with a failure to start of SW-P-1A, use EWDs to determine cause of failure. WNP-2 PER 298-0978
A.3	Control of Radiation Release JPM	2.3.11 – Ability to control Radiation Release. JPM – Determination of Shelter or Evacuation including the CNF form for a changing PAR – Conditions will be given for an emergency condition with a release underway. The decision to evacuate or shelter will have to be made.
A.4	Emergency Action Levels and Classifications. JPM	2.4.40 – Knowledge of SRO responsibilities in emergency plan implementation. JPM – Turn over the Emergency Director duties to oncoming Emergency Director – This JPM will be performed in conjunction with one of the Dynamic Scenarios.

ADMINISTRATIVE TOPICS OUTLINE FORM ES-301-1

Facility: WNP-2 Date of examination: 10/23/00 Examination level: RO		
Administrative Topic/Subject Description		Describe the method of evaluation: 1. ONE admin JPM, OR 2. TWO Administrative questions
A.1	Use of Procedures	2.1.1 – Knowledge of Conduct of Operations The question concerns what actions are required by PPM 1.3.1 for an unexpected power increase on IRM R5-6. Closed Reference WNP-2 LER 86-004
	2 Questions	2.1.21 – Ability to obtain and verify controlled procedures – The question will deal with how to verify the correct procedure is used for a surveillance procedure. Closed Reference
	Plant Parameter Verification JPM	2.1.18 – Ability to make accurate, clear and concise logs, records, status boards, and reports. JPM – Complete reactor scram Post Event Report – Following one of the evaluated dynamic scenarios, the ROs will complete a scram Post Event Report Form.
A.2	Use of P+IDs	2.1.24 – Ability to obtain and interpret station electrical and mechanical drawings.
		1 st question: Given a scenario with SM-7 powered from the Startup Transformer, using EWDs explain why LPCS-P-1 will not start by arm and depress WNP-2 PER 298-1094
	2 questions	2 nd question: Given a scenario with a failure to start of SW-P-1A, use EWDs to determine cause of failure. WNP-2 PER 298-0978
A.3	Radiation Work Permits	2.3.1 – Knowledge of 10CFR20 and related facility radiation control requirements.
	JPM	JPM – Process into the RCA using the TES system.
A.4	Emergency Action Levels and Classifications	2.4.39 – Knowledge of responsibilities in Emergency Plan Implementation. The question concerns classification of a SJAЕ Outlet High High radiation Alarm.
	2 Questions	2.4.43 – Knowledge of Emergency Communications System and Techniques. The question concerns notification of Offsite Agencies during an Emergency.

INDIVIDUAL WALK-THROUGH TEST OUTLINE FORM ES-301-2
WNP-2 October 23, 2000

Facility: WNP-2		Date of examination: October 23, 2000	
Exam level: RO / SRO-I			
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a.	Reactor Feedwater / Reactor Feed Pump Quick Start LR000131 Simulator	M	2
b.	Main Generator / Generator Capability Curve LR001153 Simulator	M, A	4
c.	Reactor Closed Cooling / Change RCC Pump Simulator	N, A, Abnormal	8
d.	RSCS / Bypass Control Rods in RSCS LR000196 Simulator	D	7
e.	AC Dist. / Transfer 480V Bus from Alt to Normal LR000227 Simulator	M, A	6
f.	RMCS / Operate CRD to make the Reactor Critical LR000228 Simulator	M, A, L	1
B2. Facility Walkthrough			
a.	NS ⁴ / Override RWCU Isolation Interlocks LR000160	D, Emergency, RCA, ESF	5
b.	Remote Shutdown / Establish Suppression Pool Cooling from the Alternate Remote Shutdown Panel LR000144 Plant	D, Emergency, RCA, ESF	5
c.	Containment Nitrogen / Open CN-V-65 with N ₂ Bottle, Local Actions LR000317 Plant	D, Emergency, RCA, ESF	3
d.	Control Rod Drive / Insert Control Rod by venting the Scram Air Header LR000249 Plant	D, Emergency, RCA	1

INDIVIDUAL WALK-THROUGH TEST OUTLINE FORM ES-301-2
WNP-2 October 23, 2000

Facility: WNP-2 Date of examination: October 23, 2000 Exam level: RO / SRO-I			
Spare JPMs			
System / JPM Title		Type Code*	Safety Function
1.	Main Steam Leakage Control / Start Main Steam Leakage Control LR000197 Simulator	D, Emergency	9
2.	Diesel Generator / Slow Start DG-1 from the Local Panel LR000198 Plant	D	6
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (L)ow power			
Indicates spare JPMs			

INDIVIDUAL WALK-THROUGH TEST OUTLINE FORM ES-301-2
WNP-2 October 23, 2000

Facility: WNP-2		Date of examination: October 23, 2000	
		Exam level: SRO-U	
B.1 Control Room Systems			
System / JPM Title / Type Codes *		Type Code	Safety Function
a.	Reactor Closed Cooling / Change RCC Pump Simulator	N, A, Abnormal	8
b.	Main Generator / Generator Capability Curve LR001153 Simulator	M, A	4
c.	RSCS / Bypass Control Rods in RSCS LR000196 Simulator	D	7
d.	Remote Shutdown / Establish Suppression Pool Cooling from the Alternate Remote Shutdown Panel LR000144 Plant	D, Emergency, RCA, ESF	5
e.	Control Rod Drive / Insert Control Rod by venting the Scram Air Header LR000249 Plant	D, Emergency, RCA	1
Spare JPMs			
System / JPM Title / Type Codes *		Type Code	Safety Function
1.	Main Steam Leakage Control / Start Main Steam Leakage Control LR000197 Simulator	D, Emergency	9
2.	Diesel Generator / Slow Start DG-1 from the Local Panel LR000198 Plant	D	6
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (L)ow power			
Indicates spare JPMs			

CHANGES MADE TO THIS REV

1. Made final admin changes for submittal to the NRC.

Facility: WNP-2**Scenario No.** 1**Op-Test No.:** 1**Examiners:** _____ **Operators:** _____

Initial conditions: IC-6. The reactor is critical, heating up, and at 400 psig on a Beginning-of-life core.**Turnover:** A reactor startup is in progress following a 3-day maintenance outage. The reactor is critical and in the heating range. Control rod sequence is at step 22-01, rod 30-03 at notch 12. One hour ago, RC-1 HALF TRIP (P601-A12-4-3) annunciated. Initial investigation shows that relay 3AY on RC-1 is energized. The work team is investigating the cause.

Event No.	Malf. No.	Event Type*	Event Description
1.		R(RO)	RO pulls control rods to maintain heat-up rate
2.		I(RO)	IRM B fails erratically causing rod block and half scram
3.		C(BOP)	Power supply for Channel A of the Rx. Bldg. Exhaust Vent Rad Monitor fails, resulting in RC-1 relay 3AX to pick-up and start WMA-FN-54A (control room emergency filtration train fan).
4.		I(ALL)	A minimum seismic earthquake results in an RPV pressure tap break causing a loss of instrumentation due to excess flow check valve, EFC-X114, closure.
5.		M(ALL)	An operating basis earthquake causes a large LOCA (recirc pump suction) and feedwater leak (feed pump suction)
6.		C(RO/BOP)	RHR-P-2A experiences an overcurrent lockout and faults SM-7
7.		C(BOP)	RHR-P-2C shaft shears

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

Facility: WNP-2	Scenario No.: 2	Op-Test No.: 1
Examiners: _____ Operators: _____ _____ _____		
Initial conditions: IC-81. The reactor is at 17% power on a beginning-of-life core. The feedwater system is in the Startup Level Control mode. The BU transformer is under clearance.		
Turnover: The plant is starting up. The reactor is currently at 18% reactor power on its way to 100%. The control rod sequence is at step 30-07, control rod 54-15 at notch 06. PPM 3.1.2 is complete through section 5.6. The BU transformer failed 1 hour ago and is under clearance so that BPA can work on it.		

Event	Malf. No.	Event Type*	Event Description
1.		R(RO)	Increase Reactor Power with control rods
2.		C(BOP)	Outboard MSIV on 'A' steam line fast closes due to failure of its 4-way air control valve. (WNP-2 PER 200-0803)
3.		N(BOP)	Transfer Feedwater lineup from Startup level control valves, RFW-FCV-10A/B, to RFPT speed control.
4.		I(RO)	RWM failure
5.		C(BOP)	Failure of REA-FN-1B causing entry into EOP 5.3.1 on high secondary containment pressure.
6.		M(ALL)	Loss of offsite power
7.		C(BOP)	Failure of DG-2 output breaker to close automatically. Requires BOP manual action to close.
8.		C(RO/BOP)	HPCS SW pump shaft seizure (LER 12-20-94) requiring trip of HPCS DG.

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

Facility: WNP-2	Scenario No. 3	Op-Test No: 1	
Examiners: _____ _____ _____	Operators: _____ _____ _____		
<p>Initial conditions: IC-15. The reactor is at 100% power with APRM B in bypass for maintenance. The core is near end-of-life.</p> <p>Turnover: The plant is at 100% rated thermal power. The plant is scheduled to shut down in 63 days for a refueling outage. BPA has scheduled an economic dispatch to 80% beginning on your shift. The “B” APRM is in bypass while the work team troubleshoots a problem in the COUNT circuit. BPA has also requested that PCB 4888 be opened at the beginning of your shift to allow for ASHE substation maintenance.</p>			
Event No.	Malf. No.	Event Type*	Event Description
1.		R(RO)	Reduce power to 80% for economic dispatch
2.		I(RO)	APRM C fails upscale during power reduction
3.		N(BOP)	BPA requests that WNP-2 opens PCB 4888 for switchyard maintenance.
4.		I(BOP)	Running DEH pump trips, standby pump fails to auto start due to instrument failure. BOP manually starts the standby pump.
5.		C(ALL)	Loss of SM-1 due to overcurrent lockout. Results in loss of feedwater
6.		M(ALL)	Reactor SCRAM with a 3 rod ATWS.
7.		C(RO/BOP)	RCIC flow controller output fails
8.		C(BOP)	PCB 4885 fails to open when the turbine trips.
9.		C(RO/BOP)	RFW-V-10A&B fail open resulting in RPV overfeed

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

Facility: WNP-2	Scenario No.: 1	Op-Test No.: 2	
Examiners: _____ Operators: _____ _____ _____			
Initial conditions: IC-10. Reactor power is at 18%. The main generator is ready for synch with the grid.			
Turnover: A plant startup is in progress. The reactor is at 18% power. PPM 3.1.2 is at step 5.7.19. Rod pull is at step 33-02, control rod 42-59 at notch 12. The main generator is at 1800 RPM and ready to synch to the grid.			
Event No.	Malf. No.	Event Type*	Event Description
1.		N(RO)	Complete synchronization of the Main Generator with the Grid.
2.		R(RO)	Continue power increase by pulling control rods.
3.		I(BOP)	TSW-TE-8 fails low causing an increase in Main Turbine Bearing Oil temperature with a resultant requirement to decrease generator load and trip the main turbine.
4.		C(RO)	One stuck control rod (58-19). RO is able to withdraw control rod by increasing control rod drive pressure. <i>(Columbia PER 299-2360)</i>
5.		I(RO/BOP)	Maintenance breaks instrument line at instrument rack causing HPCS initiation and a loss of instrumentation.
6.		M(ALL)	DEH failure causes closure of the bypass valves.
7.		M(ALL)	Reactor fails to scram on high RPV pressure due to Hydraulic ATWS
8.		M(ALL)	MS-RV-1B tail pipe failure above suppression pool level
9.		C(RO)	Operating CRD pump trips on low suction pressure following the scram <i>(Columbia PER 299-1342)</i>
10.		C(RO/BOP)	RHR-P-2A shaft shears requiring all containment spray functions off RHR B loop.

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

Facility: WNP-2**Scenario No.:** 2**Op-Test No.:** 2

Examiners: _____ **Operators:** _____

Initial conditions: IC-15 modified. Reactor power is at 91% on an end-of-life core.

Turnover: The plant is at 91% rated thermal power and is in the process of being returned to 100%. The plant will be shutting down in 48 days for a refueling outage. OSP-ELEC-M702, DG-2 Monthly Operability Surveillance, is in progress and has been completed through step 7.5.21.

Event No.	Malf. No.	Event Type*	Event Description
1.		C(BOP)	Start SW-P-1B for support of DG-2 surveillance. SW discharge valve does not open in auto. It can be opened manually.
2.		I(BOP)	Start and load DG-2 on to the bus. DG-2 has severe MVAR oscillations and has to be tripped. (WNP-2 LER 98-014-00)
3.		R(RO)	Continue power increase with reactor recirc flow.
4.		I(RO)	APRM INOP trip during power increase
5.		C(ALL)	Small earthquake causing small LOCA and shaft seizure of RWCU-P-1B
6.		M(ALL)	Large earthquake causes a large LOCA and scram
7.		C(ALL)	SM-3 startup breaker closure fails
8.		C(RO/BOP)	HPCS-V-4, HPCS injection valve, fails closed

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

Facility: WNP-2	Scenario No.: spare #1	Op-Test No.: na	
Examiners: _____ Operators: _____ _____ _____			
Initial conditions: IC-14 modified. The reactor is at 50% power on a beginning of life core.			
Turnover: The plant is in the process of a startup following a refueling. The reactor is currently at 50% rated thermal power. Your shift will be continuing the power increase. PPM 3.1.2. is complete through step 5.9.14.			
Event No.	Malf. No.	Event Type*	Event Description
1.		R(RO)	Increase power from 50%
2.		N(BOP)	Place second feed pump in service
3.		C(BOP)	The running TSW pump trips with a failure of the standby pump to auto-start. The standby pump is manually started.
4.		I(RO/BOP)	RCIC high steam flow instrument fails upscale resulting in a RCIC isolation signal and RCIC turbine trip. (WNP-2 LER 84-082-02) RCIC will fail to automatically isolate.
5.		M(ALL)	Spurious fire alarm causes a fire pump start and a rupture in the reactor building fire header. Flooding occurs in RHR C and LPCS rooms. (WNP-2 LER 98-011-00)
6.		M(ALL)	Reactor manually scrammed per PPM 5.3.1
7.		M(ALL)	Small LOCA

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

Facility: WNP-2	Scenario No.: spare #2	Op-Test No.: na	
Examiners: _____ Operators: _____ _____ _____			
Initial conditions: IC-14. The plant is at 100% power on a beginning-of-life core.			
Turnover: The plant is operating at 100% power. OSP-ELEC-M703, HPCS DG Monthly Operability Surveillance, is in progress and completed through step 7.5.24.			
Event No.	Malf. No.	Event Type*	Event Description
1.		N(BOP)	Start HPCS DG for surveillance testing.
2.		C(BOP)	HPCS SW pump trips. (<i>LaSalle LER 12-20-94</i>)
3.		I(RO)	CRD-FC-600 auto flow control fails low requiring operation in manual.
4.		C(ALL)	Traversing In-core Probe will not withdraw resulting in the inability of a PCIV to function normally. (<i>WNP-2 LER 98-10-00</i>)
5.		C(RO/BOP)	TSW to RFPT "B" oil cooler isolates resulting in high oil temperatures, vibration problems, and eventual RFPT trip.
6.		M(ALL)	Recirc runback resulting in Region A entry and resultant manual scram (<i>WNP-2 97-004</i>)
7.		C(ALL)	RFPT "A" governor fails low requiring FWLC with Condensate by lowering RPV pressure.

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

WNP2 October 2000
Initial Examination Outline Review Comments
Ryan Lantz
Chief Examiner: Tom Mckernon

Comments referenced to Form ES-201-2 Item numbers.

- 2.a. In general, identified Instrument failures may not meet the minimal quantitative guidelines of ES-301. Op Test 1: Scenario 2, shy on instrument failures. Scenario 3, event 4 looks more like a component failure, unless diagnosis of the instrument failure drives the actions required to address it. Op Test 2: Scenario 1, event 5, is the instrumentation loss acted on, or is the HPCS shutdown the only action needed? This may be a component failure.
- 3.b. RO/SROI. Is B.2.a a control room JPM? If so, it should be included in subsection B.1 as B.1.g. and if not, another control room JPM is needed and this one deleted due to repeat of safety function 5.

SROU. Change outline format to show a B.2. section. See ES-3-1, D.3.a. page 13. One of the B.1 JPMs must be ESF, and one in the entire set must be low power.
- 3.c. SRO: A.2. One of the questions may be enough to be a JPM by itself, which would negate need for the second question, which tests the same knowledge. A.3. This looks like a category A.4 JPM. Review final material to determine if this addresses radiological knowledge, or emergency plan knowledge. A.4. This must be more than a simple turnover, it must test knowledge of the emergency plan/procedures.

RO: A.1. This seems trivial, what is done here that is not done on every JPM? A.2. See comment A.2 on the SRO test above.
- 4.d. Check similarity of JPM B.1.f (RO/SROI) with the power change/ establish heat up rate evolutions in the scenarios. May need to replace the JPM.