

BWR RO EXAM OUTLINE ES-401-2**COUNT MATRIX**

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%

	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 Condition Present and Reactor Power Above APRM dwncsl or unknown / 1							x					EA1.07 – RMCS	4.0	1

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	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	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

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

EMERGENCY & ABNORMAL PLANT EVOLUTIONS - TIER 1 GROUP II

BWR - Reactor Operator

Target: 19%

Actual: 19%

	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 Temperature / 5											x	2.4.32 – Knowledge of operator response to loss of all annunciators	3.3	1

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	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	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
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

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	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%

	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 – SBTG	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

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

BWR - Reactor Operator

Target: 28%

Actual: 28%

	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 Pressure Core Spray System											x	2.1.33 – Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications. WNP-2 LER 91-015	3.4	1
8	215004 / Source Range Monitor Sys					x							K5.03 – Changing detector position	2.8	1

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	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
12	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
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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	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 /Reactor/Turbine Pressure Regulating System	x											K1.06 – Bypass Valves	3.9	1

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	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	201002 / Reactor Manual Control System								x				A2.01 – Rod movement sequence timer malfunctions	2.7	2.8
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

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

BWR - Reactor Operator

Target: 19%

Actual: 19%

	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
9	219000 / RHR/LPCI: Suppression Pool Cooling Mode										x		A4.07 – System Flow	3.5	1

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	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	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
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

Facility: WNP-2

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

	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
 ref: NUREG - 1021 rev 8
BWR RO EXAM OUTLINE ES-401-2

PLANT SYSTEMS - TIER 2 GROUP III

BWR - Reactor Operator

Target: 4%

Actual: 4%

	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%

	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. Plan	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
13		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
ref: NUREG - 1021 rev 8
BWR RO EXAM OUTLINE ES-401-2

Exam date: October 23, 2000

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

COUNT MATRIX

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	1	2	2	1	2	2	5	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 - 5 CAT 2 - 5 CAT 3 - 4 CAT 4 - 3											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%

	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 Reactivity Addition / 1								x				AA2.03 – Cause of Reactivity Addition SRO 10 CFR 55.43 WNP-2 LER 86-004	4.3	1
10	295015 / Incomplete								x				AA2.02 – Control Rod Position SRO 10 CFR 55.43	4.2	1

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

BWR SRO EXAM OUTLINE ES-401-1

	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
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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	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%

	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
8	295018 / Partial or complete loss of Component Cooling Water / 8							x					AA1.01 – Backup Systems	3.4	1

BWR SRO EXAM OUTLINE ES-401-1

	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
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

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

Category Point Totals:	3	2	3				3	5			1	Group point totals: 17		17
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BWR SRO EXAM OUTLINE ES-401-1**PLANT SYSTEMS - TIER 2 GROUP I**

BWR - Senior Reactor Operator

Target: 23%

Actual: 23%

	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 Range Monitor System									x			A3.01 – Four rod display	3.5	1
8	217000 – Reactor Core Isolation Cooling System											x	2.1.7 – Ability to evaluate plant performance	4.4	1

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

	SYSTEM #/NAME	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A 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-Off						x						K6.08 – Reactor Protection System	3.7	1
14	226001 – RHR/LPCI: Containment Spray System Mode											x	2.2.24 – Ability to analyze the affect of maintenance activities on LCO status SRO 10 CFR 55.43	3.8	1

BWR SRO EXAM OUTLINE ES-401-1

	SYSTEM #/NAME	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A TOPICS	IMP	POINTS
15	226001 – RHR/LPCI: Containment Spray System Mode										x		A4.02 – Suction Valves	3.1	1
16	241000 – Reactor/Turbine Pressure Regulating System	x											K1.06 – Bypass Valves	3.9	1
17	241000 – Reactor/Turbine Pressure Regulating System				x								K4.13 – Turbine Trip Testing WNP-2 LER 95-002	3.0	1
18	215004 – Source Range Monitor System											x	2.2.24 – Ability to analyze the affect of maintenance on LCO status. SRO 10 CFR 55.43	3.8	1
19	261000 – Standby Gas Treatment System									x			A3.02 – Fan Start	3.1	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

Facility: WNP-2

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

	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	1	2	2	1	2	2	5	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%

	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 Mode									x			A3.01 – Valve operation	3.3	1
9	239003 / MSIV Leakage Control System	x											K1.01 – Main Steam System	3.4	1

BWR SRO EXAM OUTLINE ES-401-1

	SYSTEM #/NAME	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A 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%

	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%

	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 WNP-2 LER 90-022	3.4	1
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

	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

July 27, 2000

Dear Mr. McKernon:

Subject: **WNP-2 OPERATING LICENSE NPF-21
INITIAL LICENSE EXAMINATION OUTLINE CHANGES**

Attached are changes to the examination outline materials as sent on June 26, 2000. Specifically the following changes were made:

JPM Outline

1. Moved the "Override RWCU Isolation Interlocks" JPM to the B.1 Section for Control Room Systems. Made this JPM letter g under section B.1.
2. Added Section B.2 to the SRO Upgrade outline for JPMs in the Plant.
3. Deleted the JPM to "Establish Suppression Pool Cooling from the Alternate Remote Shutdown Panel" and replaced it with "Override RWCU Isolation Interlocks" in the control room. This replacement JPM is an ESF System JPM.
4. There was a question on whether the JPM to "Operate CRD to make the Reactor Critical", Section B.1 f, was a repeat of pulling rods during the dynamic scenarios. This JPM is an Alternate Path JPM and tests the knowledge and actions for multiple control rod drifts. This JPM will remain as outlined per conversation with T. McKernon.
5. JPM B.1.e was intended to be an alternate path JPM for the Transfer of a 480 V Bus from the Alternate Supply to the Normal Supply. During the validation process it was discovered that this did not work very well as an Alternate Path JPM. A new JPM was written for the transfer from the Normal Supply to the Alternate Supply for the same 480 V Bus. This transfer works much better as an Alternate Path JPM due to the interlocks on the system.

Admin Outline

1. RO Section A.1 – The question was asked why the question on verification of controlled procedures would be any different than finding a procedure on a regular JPM? After discussion with T. McKernon, it was agreed that since we provide the examinee with the correct procedure, the question could stay as proposed.
2. Section A.2 on both outlines was originally 2 questions. Feedback from T. McKernon indicated that the use of EWDs for explanation of system actions is adequate for a JPM. Question #2 of Section A.2 on both outlines has been deleted and Question #1 will be put in the format of an Admin JPM.

Written Exam Outline

1. KA 261000A2.01 was deleted from both the SRO and RO outlines. This KA is very similar to 261000A3.02, which is also on both outlines. Questions written for these KAs tested the same knowledge and were for all practical purposes, the same question. The KA was deleted from both outlines and new KAs were selected randomly. The new KAs selected, 215004 2.2.24 and 201002A2.01, are specific to each outline; they are no longer common to both.

Scenario Outline

Ops Test 1; Scenario 1

In the "Initial Conditions", changed simulator IC from IC-6 to IC-85 to accommodate changes to the generic IC and maintain security associated with the modified IC.

In the “Turnover”, replaced rod step “22-01” with “22-1” to reflect actual terminology used on rod pull sheets. Also changed condition of RC-1 relays from “energized” to “deenergized” and added RC-1 relay “8AY” to relays affected by the portion of logic that is deenergized. Also added the statement “All pre-job briefs are complete” to minimize time spent on the front end of the scenario.

Ops Test 1; Scenario 2

In the “Initial Conditions”, changed reactor power from 17% to 14% to preclude the BOP operator from carrying out startup actions associated with the higher power level. Also, “the BU transformer” was replaced with “TRB” to reflect actual plant terminology.

In the “Turnover”, the same changes were made as in the “Initial Conditions” section. Also, the control rod sequence data has been changed to blanks to allow input once we have completed the lower power setup and re-snapped IC-81.

Moved Event No. 4 to Event No. 2 to better reflect the expected sequence of events. Also changed the RWM failure from an instrument failure to a component failure. A new instrument failure was added for the RO position as Event No. 4 (CRD flow controller). Event No. 3 (feedwater lineup transfer) was moved to Event No. 5 to accommodate the previously listed Event moves/additions. A new instrument failure was added for the BOP position as Event No. 6 (RFP min-flow controller). Event Nos. 5-8 were moved to Event Nos. 7-10, respectively, to accommodate the previously listed Event additions.

Ops Test 1; Scenario 3

In the “Initial Conditions”, changed simulator IC from IC-15 to IC-84 to accommodate changes to the generic IC and maintain security associated with the modified IC.

In the “Turnover”, the IC was changed as described above. Added the words “to commence at” to the statement regarding the BPA economic dispatch to ensure that the power change is made at the beginning of the scenario. Added the statement “The previous shift has completed PPM 3.2.5 to step 5.1.5” to preclude an extended amount of time spent on completing the initial steps of this procedure at the front end of the scenario.

Event No. 4 has been changed from an instrument failure to a component failure and the statement “due to instrument failure” has been removed from the Event Description. A new instrument failure for the BOP position was added at Event No. 5 (DEH analog amplifier failure). Event Nos. 5-9 were shifted to Event Nos. 6-10, respectively, to accommodate the additional instrument failure at Event No. 5. Event No. 7 had statement “Low RPV level” added to clarify reason for scram. Event No. 8 had statement “with no signal output rendering RCIC unusable” added to clarify direction of failure and its affect on RCIC. Event No. 9 had statement “resulting in motoring of main turbine generator” added to clarify effect of the failure.

Ops Test 2; Scenario 1

In the “Initial Conditions”, changed simulator IC from IC-10 to IC-86 to accommodate changes to the generic IC and maintain security associated with the modified IC. Power level was changed from 18% to 17% to accommodate the setup for a new instrument failure at Event No. 4.

In the “Turnover”, power level was changed as stated above. The step in PPM 3.1.2 has been changed from “5.7.19” to “5.7.20” to reflect a procedure revision. The rod pull data has been changed from “step 33-02, control rod 42-59 at notch 12” to “step 32-12, control rod 02-19 at notch 08” to accommodate a new instrument failure malfunction in Event No. 4. Also added the statement “All pre-job briefs are complete” to minimize time spent on the front end of the scenario.

A new component failure was added for the BOP position at Event No. 2 (Auto synchronization circuit failure). Event No. 2 was moved to Event No. 3 to accommodate the new component failure at Event No. 2. A new instrument failure was added for the RO position at Event No. 4 (RPIS reed switch failure). Event Nos. 3 and 4 have been moved to Event Nos. 5 and 6, respectively, to accommodate the new failures added at Event Nos. 2 and 3. Event No. 5 (TSW Temperature Element failure) has been reworded to

provide clarification on the effects of the instrument failure. The old Event No. 5 (broken instrument line) was deleted to reduce scenario time considering the additional failures added earlier in the scenario. Event No. 6 was moved to Event No. 7 to accommodate earlier event additions/deletions and has been reworded to clarify the type of DEH failure and its effects. Event Nos. 7-10 have been changed to Event Nos. 8-11, respectively, to accommodate earlier event additions/deletions.

Ops Test 2; Scenario 2

In the “Initial Conditions”, changed simulator IC from IC-15 to IC-82 to accommodate changes to the generic IC and maintain security associated with the modified IC.

In the “Turnover”, the statement, “following an economic dispatch” has been added to clarify that the plant is adhering to “power maneuvering” procedures, vice “plant startup” procedures. Added the statement “You are currently at step 5.2.20 of PPM 3.2.5” to preclude an extended amount of time spent on completing the initial steps of this procedure at the front end of the scenario. The point of entry into the DG surveillance was changed to accommodate changes made to the scenario Events. Rather than having the BOP operator start the DG and associated support equipment, he is now brought into the surveillance at the point where the DG is to be paralleled with its respective 4160 bus.

Event No. 1(Start SW-P-1B), has been deleted due to the possibility that the crew may decide to stop this evolution and the DG surveillance until this problem has been investigated and corrected. Event No. 2 has been divided into a normal event and a component failure event for the BOP position and are now Event No. 1 and Event No. 2. A new component failure has been added for the BOP position at Event No. 3 (Hotwell Level Control failure). Event Nos. 3 and 4 have been moved to Event Nos. 4 and 5, respectively, to accommodate the addition of the new component failure at Event No. 3. A new instrument failure for the BOP position has been added at Event No. 6 (Rx Bldg DP Controller failure). Event No. 7 was changed from a BOP component failure to an RO component failure based on validation crew input. An additional component failure has been added at Event No. 9 (Loss of Cond and FW) to accomplish the desired end path of the scenario. The statement “resulting in a temporary loss of SM-3 and requiring manual realignment of power to SL-31” has been added to Event No. 10 to clarify the effect of the failure. The statement “rendering HPCS unusable” was added to Event No. 11 to clarify the effect of the failure.

Spare Scenario 1

An additional instrument failure was added at Event No. 2 (Recirc Flow Unit failure). Event No. 7 (small LOCA) was deleted and replaced with Event No. 4 as a post major event failure. A new component failure for the BOP position (SRV inadvertent actuation) was placed at Event No. 4.

Spare Scenario 2

Event No. 3 was changed from a “CRD flow controller failure” to a “Rod Block Monitor failure causing a half scram” to allow use of the CRD flow controller failure in another scenario.

THE ENCLOSED EXAMINATION MATERIALS SHALL BE WITHHELD FROM PUBLIC DISCLOSURE.

If you require additional information, please contact Jim Redwine, Operations Training Specialist, at (509) 377-8350.

Respectfully,

Randy E. Guthrie
Manager, Operations Training

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	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 JPM	2.1.24 – Ability to obtain and interpret station electrical and mechanical drawings. JPM - 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
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.

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 2.1.21 – 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
	2 Questions	
	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 JPM	2.1.24 – Ability to obtain and interpret station electrical and mechanical drawings. JPM - 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
A.3	Radiation Work Permits JPM	2.3.1 – Knowledge of 10CFR20 and related facility radiation control requirements. JPM – Process into the RCA using the TES system.
A.4	Emergency Action Levels and Classifications 2 Questions	2.4.39 – Knowledge of responsibilities in Emergency Plan Implementation. The question concerns classification of a SJAE Outlet High High radiation Alarm. 2.4.43 – Knowledge of Emergency Communications System and Techniques. The question concerns notification of Offsite Agencies during an Emergency.

NOTE: The question RA.1-1 was changed to add 1 more open reference question to the RO Admin Exam. This change was driven by form ES301-3. This requires the Admin portion of the exam be predominately open reference questions. The modification of this question to an open reference question gives a 50% open reference versus closed reference on both the SRO and the RO admin exam. This is acceptable per telephone conversation with Tom McKernon. The KA for RA.1-1 was not changed, so the outline has not change. The following is the text of the new question:

A maintenance test has been performed on RHR-V-24A, Test Return, (MOV type SMB-3) that required the valve to be stroked from closed to full open and back to closed 5 times, with no time between change of direction. The valve takes an average of 3 minutes to stroke full open and back closed. The work order has allowed no deviation in duty cycle requirements.

What is the required cooldown time prior to the next allowable operation of RHR-V-24A?

OPEN REFERENCE

Facility: WNP-2	Scenario No. 1	Op-Test No.: 1
Examiners: _____ Operators: _____ _____ _____		
Initial conditions: IC-85. 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 22-1, rod 30-03 at notch 12. One hour ago, RC-1 HALF TRIP (P601-A12-4-3) annunciated. Initial investigation shows that relay 3AY and 8AY on RC-1 are de-energized. The work team is investigating the cause. All pre-job briefs are complete.		

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 instrument line 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 14% power on a beginning-of-life core. The feedwater system is in the Startup Level Control mode. TRB is under clearance.		
Turnover: The plant is starting up. The reactor is currently at 14% reactor power on its way to 100%. The control rod sequence is at step _____, control rod _____ at notch _____. PPM 3.1.2 is complete through section 5.6. TRB 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(RO)	RWM failure results in loss of ability to move control rods
3.		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)
4.		I(RO)	CRD flow controller auto mode fails requiring transfer to manual and manual adjustment of CRD flow.
5.		N(BOP)	Transfer Feedwater lineup from Startup level control valves, RFW-FCV-10A/B, to RFPT speed control.
6.		I(BOP)	Automatic operation of reactor feed pump min-flow controller becomes erratic resulting in reactor water level swings and requiring manual control of minimum flow.
7.		C(BOP)	Failure of REA-FN-1B causing entry into EOP 5.3.1 on high secondary containment pressure.
8.		M(ALL)	Loss of offsite power
9.		C(BOP)	Failure of DG-2 output breaker to close automatically. Requires BOP manual action to close.
10.		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-84. 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% to commence at the beginning on your shift. The previous shift has completed PPM 3.2.5 to step 5.1.5. 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. All pre-job briefs are complete</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 open PCB 4888 for switchyard maintenance.
4.		C(BOP)	Running DEH pump trips, standby DEH pump fails to auto start. BOP manually starts the standby pump.
5.		I(BOP)	DEH analog amplifier for BPVs output fails high causing all BPVs to go full open requiring BOP to take manual control of BPVs to shut them.
6.		C(ALL)	Loss of SM-1 due to overcurrent lockout. Results in loss of feedwater
7.		M(ALL)	Low RPV level reactor SCRAM with a 3 rod ATWS.
8.		I(RO/BOP)	RCIC flow controller output fails with no signal output rendering RCIC unusable.
9.		C(BOP)	PCB 4885 fails to open when the turbine trips resulting in motoring of main turbine generator.
10.		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-86. Reactor power is at 17%. The main generator is ready for synch with the grid.		
Turnover: A plant startup is in progress. The reactor is at 17% power. PPM 3.1.2 is at step 5.7.20. Rod pull is at step 32-12, control rod 02-19 at notch 08. The main generator is at 1800 RPM and ready to synch to the grid. All pre-job briefs are complete.		

Event No.	Malf. No.	Event Type*	Event Description
1.		N(BOP)	Complete synchronization of the Main Generator with the Grid.
2.		C(BOP)	Main Generator auto synchronization circuit fails requiring manual synchronization of the main generator with the grid.
3.		R(RO)	Continue power increase by pulling control rods.
4.		I(RO)	Control Rod 02-19 position 10 reed switch fails requiring substitute rod position entry.
5.		I(BOP)	TSW-TE-8 instrument output fails low causing a loss of main turbine lube oil temperature indication and causing TSW-TCV-8 to go closed (due to sensed low temperature input) causing an increase in Main Turbine Bearing Oil temperature with a resultant requirement to decrease generator load and trip the main turbine.
6.		C(RO)	Stuck control rod (58-19). The RO will be able to withdraw the control rod by increasing control rod drive pressure. <i>(Columbia PER 299-2360)</i>
7.		M(ALL)	Rupture in DEH causes loss of pressure in DEH resulting in the closure of all bypass valves and a high RPV pressure condition.
8.		M(ALL)	Reactor fails to scram on high RPV pressure due to Hydraulic ATWS.
9.		M(ALL)	MS-RV-1B tailpipe failure above suppression pool level.
10.		C(RO)	Operating CRD pump trips on low suction pressure following the scram <i>(Columbia PER 299-1342)</i>
11.		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. 3	Op-Test No: 1	
Examiners: _____ _____ _____	Operators: _____ _____ _____		
<p>Initial conditions: IC-84. 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% to commence at the beginning on your shift. The previous shift has completed PPM 3.2.5 to step 5.1.5. 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. All pre-job briefs are complete</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 open PCB 4888 for switchyard maintenance.
4.		C(BOP)	Running DEH pump trips, standby DEH pump fails to auto start. BOP manually starts the standby pump.
5.		I(BOP)	DEH analog amplifier for BPVs output fails high causing all BPVs to go full open requiring BOP to take manual control of BPVs to shut them.
6.		C(ALL)	Loss of SM-1 due to overcurrent lockout. Results in loss of feedwater
7.		M(ALL)	Low RPV level reactor SCRAM with a 3 rod ATWS.
8.		I(RO/BOP)	RCIC flow controller output fails with no signal output rendering RCIC unusable.
9.		C(BOP)	PCB 4885 fails to open when the turbine trips resulting in motoring of main turbine generator.
10.		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-86. Reactor power is at 17%. The main generator is ready for synch with the grid.		
Turnover: A plant startup is in progress. The reactor is at 17% power. PPM 3.1.2 is at step 5.7.20. Rod pull is at step 32-12, control rod 02-19 at notch 08. The main generator is at 1800 RPM and ready to synch to the grid. All pre-job briefs are complete.		

Event No.	Malf. No.	Event Type*	Event Description
1.		N(BOP)	Complete synchronization of the Main Generator with the Grid.
2.		C(BOP)	Main Generator auto synchronization circuit fails requiring manual synchronization of the main generator with the grid.
3.		R(RO)	Continue power increase by pulling control rods.
4.		I(RO)	Control Rod 02-19 position 10 reed switch fails requiring substitute rod position entry.
5.		I(BOP)	TSW-TE-8 instrument output fails low causing a loss of main turbine lube oil temperature indication and causing TSW-TCV-8 to go closed (due to sensed low temperature input) causing an increase in Main Turbine Bearing Oil temperature with a resultant requirement to decrease generator load and trip the main turbine.
6.		C(RO)	Stuck control rod (58-19). The RO will be able to withdraw the control rod by increasing control rod drive pressure. <i>(Columbia PER 299-2360)</i>
7.		M(ALL)	Rupture in DEH causes loss of pressure in DEH resulting in the closure of all bypass valves and a high RPV pressure condition.
8.		M(ALL)	Reactor fails to scram on high RPV pressure due to Hydraulic ATWS.
9.		M(ALL)	MS-RV-1B tailpipe failure above suppression pool level.
10.		C(RO)	Operating CRD pump trips on low suction pressure following the scram <i>(Columbia PER 299-1342)</i>
11.		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-82. 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% following an economic dispatch. You are currently at step 5.2.20 of PPM 3.2.5. The plant will be shutting down in 48 days for a refueling outage. The DG-2 Monthly Operability Surveillance, OSP-ELEC-M702, is in progress and has been completed through step 7.5.36 (DG has been running in idle for 10 minutes). SW-P-1B is running to support the DG surveillance. All pre-job briefs are complete.			
Event No.	Malf. No.	Event Type*	Event Description
1.		N(BOP)	Parallel DG-2 to the bus.
2.		C(BOP)	DG-2 voltage regulator failure causes MVARs to go upscale requiring the DG to be tripped. (WNP-2 LER 98-014-00)
3.		C(BOP)	Hotwell level controller (LIC-2) power supply fails while hotwell level is on an upward trend requiring BOP to transfer control to LIC-1 and manually restore level in hotwell.
4.		R(RO)	Continue power increase with reactor recirc flow.
5.		I(RO)	APRM INOP trip during power increase
6.		I(BOP)	Reactor Building DP controller, REA-DPIC-1A, auto feature fails causing high positive pressure in secondary containment and requiring BOP to take manual control of DP to restore negative pressure.
7.		C(RO)	Small earthquake causes a small LOCA and shaft seizure of RWCU-P-1B
8.		M(ALL)	Large earthquake causes a large LOCA and scram
9.		C(RO/BOP)	Loss of condensate and feedwater system
10.		C(ALL)	SM-3 startup breaker closure fails resulting in temporary loss of SM-3 and requiring manual realignment of power to SL-31.
11.		C(BOP)	HPCS-V-4, HPCS injection valve, fails closed rendering HPCS unusable.

* (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.		I(RO)	Recirc Flow Unit 'C' fails downscale resulting in a half scram.
3.		N(BOP)	Place second feed pump in service
4.		C(BOP)	The running TSW pump trips with a failure of the standby pump to auto-start. The standby pump is manually started.
5.		C(BOP)	Inadvertent actuation of MS-RV-1A requiring fuse removal to close the SRV.
6.		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)
7.		M(ALL)	Reactor manually scrammed per PPM 5.3.1
8.		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.

* (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)	Rod Block Monitor Channel 'B' fails upscale resulting in a half scram and rod block.
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