Facility: Palo Verde REV 0

Date Of Exam: 03/16/2012

Tier	Group	RO K/A Category Points												SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2			G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	0			0	0
	2	2	2	2				2	1			0	9	0			0	0
	Tier Totals	5	5	5				5	4			3	27	0			0	0
2. Plant Systems	1	3	2	3	3	3	2	3	3	2	2	2	28	0			0	0
	2	1	1	1	1	1	1	1	1	1	1	0	10	0		0	0	0
	Tier Totals	4	3	4	4	4	3	4	4	3	3	2	38	0			0	0
3. Generic Knowledge And Abilities Categories		1			2			3			4		10	1	2	3	4	0
		2			3			2			3			0	0	0	0	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR RO Examination Outline

Facility: Palo Verde

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1					X		EA2.03 - Reactor trip breaker position	4.2	1
000008 Pressurizer Vapor Space Accident / 3		X					AK2.01 - Valves	2.7*	1
000009 Small Break LOCA / 3			X				EK3.28 - Manual ESFAS initiation requirements	4.5	1
000011 Large Break LOCA / 3		X					EK2.02 - Pumps	2.6*	1
000015/000017 RCP Malfunctions / 4	X						AK1.01 - Natural circulation in a nuclear reactor power plant	4.4	1
000022 Loss of Rx Coolant Makeup / 2			X				AK3.01 - Adjustment of RCP seal backpressure regulator valve to obtain normal flow	2.7	1
000025 Loss of RHR System / 4				X			AA1.04 - Closed cooling water pumps	2.8*	1
000026 Loss of Component Cooling Water / 8					X		AA2.02 - The cause of possible CCW loss	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3						X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	1
000029 ATWS / 1	X						EK1.03 - Effects of boron on reactivity	3.6	1
000038 Steam Gen. Tube Rupture / 3						X	2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	1
000055 Station Blackout / 6			X				EK3.01 - Length of time for which battery capacity is designed	2.7	1
000056 Loss of Off-site Power / 6					X		AA2.17 - Operational status of PZR backup heaters	3.4	1
000057 Loss of Vital AC Inst. Bus / 6						X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.2	1
000058 Loss of DC Power / 6	X						AK1.01 -Battery charger equipment and instrumentation	2.8	1
000065 Loss of Instrument Air / 8				X			AA1.03 - Restoration of systems served by instrument air when pressure is regained	2.9	1
CE/E05 Steam Line Rupture - Excessive Heat Transfer / 4		X					EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.7	1

PWR RO Examination Outline

Facility: Palo Verde

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
CE/E06 Loss of Main Feedwater / 4				X			EA1.2 - Operating behavior characteristics of the facility	3.4	1
K/A Category Totals:	**3**	**3**	**3**	**3**	**3**	**3**	**Group Point Total:**		**18**

PWR RO Examination Outline

Facility: Palo Verde

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000001 Continuous Rod Withdrawal / 1				X			AA1.07 - RPI	3.3	1
000005 Inoperable/Stuck Control Rod / 1			X				AK3.06 - Actions contained in EOP for inoperable/stuck control rod	3.9	1
000024 Emergency Boration / 1	X						AK1.02 - Relationship between boron addition and reactor power	3.6	1
000060 Accidental Gaseous Radwaste Rel. / 9		X					AK2.01 - ARM system, including the normal radiation-level indications and the operability status	2.6	1
000068 Control Room Evac. / 8		X					AK2.02 - Reactor trip system	3.7	1
000069 Loss of CTMT Integrity / 5					X		AA2.01 - Loss of containment integrity	3.7	1
CE/A11 RCS Overcooling - PTS / 4			X				EK3.1 - Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics	3.2	1
CE/A13 Natural Circ. / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with (Natural Selection Operations)	3.2	1
CE/E09 Functional Recovery				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.2	1
K/A Category Totals:	**2**	**2**	**2**	**2**	**1**	**0**	**Group Point Total:**		**9**

PWR RO Examination Outline

REV 0

Facility: Palo Verde

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
003 Reactor Coolant Pump								X				A2.05 - Effects of VCT pressure on RCP seal leakoff flows	2.5	1
003 Reactor Coolant Pump						X						K6.04 - Containment isolation valves affecting RCP operation	2.8	1
004 Chemical and Volume Control	X											K1.04 - RCPS, including seal injection flows	3.4	1
005 Residual Heat Removal			X									K3.07 - Refueling operations	3.2*	1
006 Emergency Core Cooling	X											K1.03 - RCS	4.2	1
007 Pressurizer Relief/Quench Tank								X				A2.05 - Exceeding PRT high-pressure limits	3.2	1
008 Component Cooling Water		X										K2.02 - CCW pump, including emergency backup	3.0*	1
010 Pressurizer Pressure Control					X							K5.01 -Determination of condition of fluid in PZR, using steam tables	3.5	1
012 Reactor Protection				X								K4.09 - Separation of control and protection circuits	2.8	1
012 Reactor Protection										X		A4.04 - Bistable, trips, reset and test switches	3.3*	1
013 Engineered Safety Features Actuation					X							K5.01 - Definitions of safety train and ESF channel	2.8	1
022 Containment Cooling										X		A4.01 - CCS fans	3.6	1
026 Containment Spray									X			A3.01 - Pump starts and correct MOV positioning	4.3	1
039 Main and Reheat Steam			X									K3.03 - AFW pumps	3.2*	1
059 Main Feedwater							X					A1.03 -Power level restrictions for operation of MFW pumps and valves	2.7*	1
061 Auxiliary/Emergency Feedwater					X							K5.03 - Pump head effects when control valve is shut	2.6	1
061 Auxiliary/Emergency Feedwater			X									K3.02 - S/G	4.2	1
062 AC Electrical Distribution				X								K4.03 -Interlocks between automatic bus transfer and breakers	2.8*	1
062 AC Electrical Distribution									X			A3.01 - Vital ac bus amperage	3.0	1
063 DC Electrical Distribution		X										K2.01 - Major DC loads	2.9*	1
063 DC Electrical Distribution											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
064 Emergency Diesel Generator						X						K6.07 - Air receivers	2.7	1
064 Emergency Diesel Generator							X					A1.08 -Maintaining	3.1	1

PWR RO Examination Outline

Facility: Palo Verde

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic minimum load on ED/G (to prevent reverse power)	Imp.	Points
073 Process Radiation Monitoring											X	2.2.39 - Knowledge of less than or equal to one hour Technical Specification action statements for systems.	3.9	1
076 Service Water								X				A2.01 - Loss of SWS	3.5*	1
076 Service Water	X											K1.19 - SWS emergency heat loads	3.6*	1
078 Instrument Air				X								K4.01 -Manual/automatic transfers of control	2.7	1
103 Containment							X					A1.01 -Containment pressure, temperature, and humidity	3.7	1
K/A Category Totals:	**3**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**Group Point Total:**		**28**

PWR RO Examination Outline

Facility: Palo Verde

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001 Control Rod Drive										X		A4.01 - Controls for CCWS	3.1	1
002 Reactor Coolant			X									K3.03 - Containment	4.2	1
016 Non-nuclear Instrumentation									X			A3.01 - Automatic selection of NNIS inputs to control systems	2.9*	1
017 In-core Temperature Monitor	X											K1.01 - Plant computer	3.2*	1
028 Hydrogen Recombiner and Purge Control							X					A1.02 - Containment pressure	3.4*	1
029 Containment Purge								X				A2.03 - Startup operations and the associated required valve lineups	2.7	1
033 Spent Fuel Pool Cooling				X								K4.01 - Maintenance of spent fuel level	2.9	1
041 Steam Dump/Turbine Bypass Control						X						K6.03 - Controller and positioners, including ICS, S/G, CRDS	2.7	1
072 Area Radiation Monitoring					X							K5.01 - Radiation theory, including sources, types, units, and effects	2.7	1
075 Circulating Water		X										K2.03 - Emergency/essential SWS pumps	2.6*	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**Group Point Total:**		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

REV 0

Facility: Palo Verde

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.26	Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen).	3.4	1
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management.	4.3	1
		Category Total:		**2**
Equipment Control	2.2.14	Knowledge of the process for controlling equipment configuration or status.	3.9	1
	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tagouts, etc.	3.9	1
	2.2.44	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	1
		Category Total:		**3**
Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	1
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc.	2.9	1
		Category Total:		**2**
Emergency Procedures/Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.	3.5	1
	2.4.31	Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	1
		Category Total:		**3**
		Generic Total:		**10**

Facility: Palo Verde REV 0

Date Of Exam: 03/16/2012

Tier	Group	RO K/A Category Points												SRO-Only Points					
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2			G*	Total	
1. Emergency & Abnormal Plant Evolutions	1	0	0	0	N/A			0	0	N/A		0	0	4			2	6	
	2	0	0	0				0	0			0	0	2			2	4	
	Tier Totals	0	0	0				0	0			0	0	6			4	10	
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	3			2	5	
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2		1	3	
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	5			3	8	
3. Generic Knowledge And Abilities Categories		1		2		3		4					0	1	2	3	4		7
		0		0		0		0						2	2	1	2		

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR SRO Examination Outline

Facility: Palo Verde

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000011 Large Break LOCA / 3						X	2.4.41 - Knowledge of the emergency action level thresholds and classifications.	4.6	1
000025 Loss of RHR System / 4						X	2.4.6 - Knowledge of EOP mitigation strategies.	4.7	1
000038 Steam Gen. Tube Rupture / 3					X		EA2.15 - Pressure at which to maintain RCS during S/G cooldown	4.4	1
000056 Loss of Off-site Power / 6					X		AA2.09 - Operational status of reactor building cooling unit	2.9	1
000057 Loss of Vital AC Inst. Bus / 6					X		AA2.20 - Interlocks in effect on loss of ac vital electrical instrument bus that must be bypassed to restore normal equipment operation	3.9	1
CE/E05 Steam Line Rupture - Excessive Heat Transfer / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.2	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**4**	**2**	**Group Point Total:**		**6**

PWR SRO Examination Outline

Facility: Palo Verde

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000003 Dropped Control Rod / 1						X	2.2.38 - Knowledge of conditions and limitations in the facility license.	4.5	1
000024 Emergency Boration / 1					X		AA2.06 - When boron dilution is taking place	3.7	1
CE/A16 Excess RCS Leakage / 2						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	1
CE/E09 Functional Recovery					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.0	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**2**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Facility: Palo Verde

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
004 Chemical and Volume Control								X				A2.26 - Low VCT pressure	3.0	1
006 Emergency Core Cooling								X				A2.04 - Improper discharge pressure	3.8	1
010 Pressurizer Pressure Control											X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.3	1
059 Main Feedwater											X	2.4.11 -Knowledge of abnormal condition procedures.	4.2	1
064 Emergency Diesel Generator								X				A2.10 - Unloading (reduction of generated power) in steps over a period of time	2.9	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**2**	**Group Point Total:**		**5**

PWR SRO Examination Outline

Facility: Palo Verde

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
002 Reactor Coolant											X	2.2.40 - Ability to apply Technical Specifications for a system.	4.7	1
011 Pressurizer Level Control								X				A2.05 - Loss of PZR heaters	3.7	1
072 Area Radiation Monitoring								X				A2.03 -Blown power-supply fuses	2.9	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**Group Point Total:RE**		**3**

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

REV 0

Facility: Palo Verde

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.14	Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.	3.1	1
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	1
		Category Total:		**2**
Equipment Control	2.2.11	Knowledge of the process for controlling temporary design changes.	3.3	1
	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	3.9	1
		Category Total:		**2**
Radiation Control	2.3.11	Ability to control radiation releases.	4.3	1
		Category Total:		**1**
Emergency Procedures/Plan	2.4.38	Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required.	4.4	1
	2.4.40	Knowledge of SRO responsibilities in emergency plan implementation.	4.5	1
		Category Total:		**2**
		Generic Total:		**7**

PVNGS License Examination
Record of Rejected K/As

Exam Date 03/16/12

PVNGS Form ES-401-4

Tier / Group	Randomly Selected K/As	Reason for Rejection
RO Exam		
NONE	NONE	NONE

PVNGS License Examination
Record of Rejected K/As

Exam Date 03/16/12

PVNGS Form ES-401-4

Tier / Group	Randomly Selected K/As	Reason for Rejection
SRO Exam		
2/1	010 2.4.20	PVNGS EOPs do not contain any notes on PPCS. Replaced with 3.3 010 A2.02
2/1	064 A2.10	This KA is not at the SRO level. Replaced with 3.8 078 A2.01
2/2	011 A2.05	Loss of PZR Heaters has no effect on PLCS. Replaced with 041 A2.02

Facility: PVNGS Date of Examination: 03/19/12

Examination Level: RO ☑ SRO ☐ Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N,R	Determine ability to stand shift with training and license proficiency time. (2.1.4)
Conduct of Operations	M,R	In Lower Mode determine Pressurizer level and RCS volume to be drained to the Refueling Water Tank (RWT). (2.1.25)
Equipment Control	N,R	Tech Review a permit (clearance) (2.2.13)
Radiation Control	D	Determine the proper REP task and RCA entry requirements. (2.3.7)
Emergency Procedures/Plan		

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: PVNGS Date of Examination: 03/19/12

Examination Level: RO ☐ SRO ☑ Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N,R	Determine if manning is met with medical and training requirements. (2.1.4)
Conduct of Operations	N,R	Determine "if time shutdown" is met and makeup flow requirements for mid-loop (2.1.20)
Equipment Control	N,R	Identify unit differences and applicable LCO due to loss of AC Inverter. (2.2.3, 2.2.22)
Radiation Control	M,R	Determine hold points exceeded, approval needed, and which AO will perform the task (2.3.4)
Emergency Procedures/Plan	D,R	Determine Classification, Protective Action Recommendation and Release status (2.4.41)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: PVNGS
Exam Level: RO [✔] SRO-I [ ] SRO-U [ ]
Date of Examination: 03/19/12
Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Perform Containment Power Access Purge (3.8 029 A2.03)	L,D	8
b. Boration (normal path doesn't work) (3.2 004 A4.07)	L,N,A	1
c. Startup second MFP (3.4 039 A4.03)	N	4S
d. Fill a SIT (3,3 006 A1.13)	N	3
e. Pump RDT with high temperature (3,5 007 A 2.05)	L,N,A	5
f. Reset inadvertent MSIS (3.2 013 A4.01)	L,D,A	2
g. Restore offsite power to PBA-S03 (powered from DG 'A') (3.6 062 A4.01)	D	6
h. Place CS B in service on SDC (3.4 005 A4.01)	L,D	4P
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align SDC valves during a Control Room Fire (4.2 067 AA2.16)	N,A,E,R	4P
j. Operation of AFA-P01 from Remote Shutdown Panel (3.4 061 A3.01)	D,E	4S
k. Align offsite power to PBB per Appendix C of 40AO-9ZZ19 (3.6 062 A2.06)	D,EN,E	6

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: PVNGS Date of Examination: 03/19/12
Exam Level: RO ☐ SRO-I ☑ SRO-U ☐ Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Perform Containment Power Access Purge (3.8 029 A2.03)	L,D	8
b. Boration (normal path doesn't work) (3.2 004 A4.07)	L,N,A	1
c. Fill a SIT (3.3 006 A1.13)	N	3
d. Pump RDT with high temperature (3.5 007 A2.05)	L,N,A	5
e. Reset inadvertent MSIS (3.2 013 A 4.01)	L,D,A	2
f. Restore offsite power to PBA-S03 (powered from DG 'A') (3.6 062 A 4.01)	D	6
g. ESD with no CIAS, CSAS with CIAS valves that fail to close (3.7 012 A 4.02)	L,N,A,EN	7
h.		
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align SDC valves during a Control Room Fire (4.2 067 AA2.16)	N,A,E,R	4P
j. Operation of AFA-P01 from Remote Shutdown Panel (3.4 061 A3.01)	D,E	4S
k. Align offsite power to PBB per Appendix C of 40AO-9ZZ19 (3.6 062 A2.06)	D,EN,E	6

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: PVNGS
Exam Level: RO ☐ SRO-I ☐ SRO-U ☑

Date of Examination: 03/19/12
Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Perform Containment Power Access Purge (3.8 029 A2.03)	L,D	8
b. Boration (normal path doesn't work) (3.2 004 A4.07)	L,N,A	1
c. ESD with no CIAS, CSAS with CIAS valves that fail to close (3.7 012 A 4.02)	L,N,A,EN	7
d.		
e.		
f.		
g.		
h.		
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Align SDC valves during a Control Room Fire (4.2 067 AA2.16)	N,A,E,R	4P
j. Operation of AFA-P01 from Remote Shutdown Panel (3.4 061 A3.01)	D,E	4S
k.		

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: PVNGS Scenario No.: 1 Op-Test No: 2012

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: (100% power, MOC).

Turnover: Unit 1 is at 100% power (250 EFPD). Auxiliary Feedwater Pump 'A' and Containment Spray 'A' are tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N CO/SRO	Shift Turbine Cooling water pumps.
2	cmTRCV05CHNLT227_4	C RO/SRO	Volume Control Tank level transmitter, CHN-LT-227 fails low causing a boration. Crew takes action to return CCP suction to the Volume Control Tank.
3	mfRM01A	I CO/SRO	Control Room monitor, RU-29, fails high. Crew will bypass CREFAS "A".
4	cmCPCC06EWAP01_5 (In setup)	C RO/SRO (TS)	Essential Cooling water pump "A" fails to auto start on CREFAS actuation. RO will start EW pump "A".
5	mfTH06A f:0.02	C ALL (TS)	Steam Generator 1 Tube Leak **40AO-9ZZ02, Excessive RCS Leakrate**
6	mfED16C	C CO/SRO (T/S)	Loss of Class DC power PKC-M43. **40AO-9ZZ13, Loss of Class Instrument or Control Power**
7	mfTH06A f:50	M ALL	Steam Generator 1 Tube Leak degrades to a Rupture. **40EP-9EO04, Steam Generator Tube Rupture**
8	cmCPSI01SIAP02_5 (In setup)	C RO/SRO	HPSI pump "A" fails to auto start on SIAS/CIAS actuation
9	mfRX01 f:0	I CO/SRO	Tave fails low, Requires manual control of Main Feedwater flow.
			CRITICAL TASK – Reset MSIS during cooldown to prevent unmonitored release to public.
End point	Faulted SG is isolated per Standard Appendix 113, SG 1 Isolation		Faulted SG is isolated **CRITICAL TASK –Isolate faulted SG within 70 minutes of initiation of SGTR.**

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

Turnover

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is ORANGE.

Train B is protected equipment.

AF 'B' and AF 'N' are protected.

CS 'B' is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Vibration shop reported that in a review of data they found some unusual readings with Turbine Cooling Water pump "A". A vibration technician and AO are have been briefed and are standing by for a TCW pump shift. Appendix "D" of 40OP-9TC01 has been completed.

Equipment out of service:

Auxiliary Feedpump 'A' (AFA-P01) is tagged out due to a noisy bearing.

CS 'A' is tagged out for scheduled maintenance.

Planned shift activities:

Remove the "B" Turbine Cooling Water pump from service.

Facility: PVNGS Scenario No.: 2 Op-Test No: 2012

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: (100% power, MOC).

Turnover: Unit 1 is at 100% power (250 EFPD). AFA-P01 and Containment Spray 'A' are tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N CO/SRO	Shift from Hydraulic Fluid Pump B to Pump A per section 4.7 of 40OP-9C001, Electro-Hydraulic Control System.
2	mfNI02C f:0	I CO/SRO	Control Channel 2 fails low (50% Power indicated). Crew selects channel 1 at the RRS system panel. **40AO-9ZZ16, RRS Malfunctions**
3	mfTH01A f:0.01	C RO/SRO (TS)	Small RCS leak. Crew takes action per section 3 of ~16 gpm **40AO-9ZZ02, Excessive RCS Leakrate**
4	mfAN_1A03D1 doeED_ZLS037271DS_W1 doRP_ZLSAAC02ALOP1_W1	C CO/SRO (TS)	LOP relay failure. Crew responds using 41AL-1RK1A (1A03D) Crew determines that a LOP should not have occurred and takes action to bypass the appropriate relays per 40OP-9SA01
5	IOR dims_ZDSGEUV170	R -RO N - CO/SRO	An MSIV goes closed. Crew responds per 40AL-9RK6A and begins a down power to less than 65% power.
6	cmCPTP01CENP01B_6	C CO/SRO	Stator Cooling Pump 'B' trips with standby pump failing to auto start.
7	mfTH01A f:3	M ALL	LOCA RCS leak degrades requiring a reactor trip. **40EP-9EO03, Loss of Coolant Accident**
8	Scenario file noSI/CI	C RO/SRO	SIAS/CIAS/MSIS fail to automatically initiate. **CRITCAL TASK – Initiate SI flow when the SIAS setpoint has been exceeded.**
9	cmCPRH05SIBP03_6	C RO/SRO	CS pump "B" trips on an 86 lockout **CRITCAL TASK –Initiate CS flow when the CSAS setpoint has been exceeded.** **40EP-9EO09, Functional Recovery Procedure**
End point	Scenario may be ended once SIAS and CSAS flow have been established using LPSI.		

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

Turnover

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is ORANGE.

Train B is protected equipment.

AF 'B' and AF 'N' are protected.

CS 'B' is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Equipment out of service:

Auxiliary Feedpump 'A' (AFA-P01) is tagged out due to a noisy bearing.

CS 'A' is tagged out for scheduled maintenance.

Planned shift activities:

The crew needs to shift EHC pumps from B to A to support vibration readings. The vibration tech is standing by.

Facility: PVNGS Scenario No.: 3 Op-Test No: 2012

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: (2% power, MOC).

Turnover: Unit 1 is at 4% power (200 EFPD). AFA-P01 and Containment Spray 'A' are tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N CO/SRO	Shift the MFP Lube oil pumps per 4.9 of 40OP-9FT02, Feedwater Pump Turbine B.
2	cmAVRC03RCEPV100F_1	C RO/SRO	Pressurizer spray valve fails open.
3	mfRP06L1 mfRP06L2	C CO/SRO (TS)	Inadvertent AFAS, "B" train AFW pumps and valves align to initiate AFW flow to the SGs. Crew takes actions to terminate flow and resulting power increase. **40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations**
4	cmCNCV04CHNFIC243_2 f:100	I RO/SRO	A seal injection controller will fail closed in automatic requiring the crew to take manual control of the controller
5	mfED10B cmBKEG03PBBS04B_3	C RO/SRO (TS)	NBN-X04 faults and DG "B breaker fails to close causing a LOP of class 4160 bus, PBB-S04 **40AO-9ZZ12, Degraded Electrical.**
6	mfRD10B	M ALL	Continuous CEA withdrawal. Crew places CEDMCS in "STANDBY" then trips the reactor per: **40AO-9ZZ11, CEA Malfunctions**
7	mfRD03G mfRD03L mfRD03M	C RO/SRO	Multiple CEAs stick out on the reactor trip. **CRITICAL TASK – Crew establishes > 44 gpm boration.** **40EP-9EO02, Reactor Trip**
8	cmAVMC01CDNHV45A_1	C CO/SRO	Loss of Main Condenser Vacuum. CO must shift feedwater flow to AFN-P01.
9	mfFW21A	C CO/SRO	Trip of AFN-P01 **CRITICAL TASK – Implement the FRP to restore power to PBB-S04 and establish AFW flow to the SGs.** **40EP-9EO09, Functional Recovery Procedure**
End point	Crew has restored AFW flow to the SGs		

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

Turnover

Plant conditions:

Unit 1 is at 2% power.

The plant has been at 2% power for 2 days awaiting repair of AFA-P01.

The core is presently at 250 EFPD.

Risk Management Action Level is ORANGE.

Train B is protected equipment.

AF 'B' and AF 'N' are protected.

CS 'B' is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

Maintenance was completed on Main Lube Oil pump LON-P07B at the end of last shift and it is ready o be tested.

Equipment out of service:

Auxiliary Feedpump 'A' (AFA-P01) is tagged out due to a noisy bearing.

CS 'A' is tagged out for scheduled maintenance.

Planned shift activities:

Shift the running and standby lube oil pumps on Main Feedpump "B".

Facility: PVNGS Scenario No.: 4 Op-Test No: 2012

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: (100% power, MOC).

Turnover: Unit 1 is at 100% power (250 EFPD). AFA-P01 and Containment Spray 'A' are tagged out.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N CO/SRO	Shift Steam Bypass Master Controller, SGN-PIC-1010 from manual to automatic mode of operation.
2	mfTRRX11SGCPT1013C_4	I CO/SRO (TS)	Channel "C" SG 1 pressure transmitter fails low requiring multiple parameters to be placed in bypass. (SGC-PI-1013C)
3	cmTRCV19RCALT110X_4	I RO/SRO (TS)	Pressurizer level transmitter "X" fails low. Crew selects channel "Y" on pressurizer heater and level control selectors.
4	mfCH01A mfCH01C	C CO/SRO	Loss of Control Element Drive Mechanism cooling. HCN-A02B and A02D fans fail to auto-start **40AO-9ZZ20, Loss of HVAC**
5	mfMC01A	R -RO N - CO/SRO	Loss of condenser vacuum requiring the crew to downpower. **40AO-9ZZ07, Loss of Condenser Vacuum**
6	mfCV11A f:100	C SRO	RCP 1A seal failure. Crew evaluates the status of the affected RCP. **40AO-9ZZ04, Reactor Coolant Pump Emergencies**
7	cmCPRC02RCEP01A_6 mfRP04A mfRP04C mfRD12A	M ALL	RCP 1A trips but PPS fails to initiate a reactor trip. RO opens L03B2 and L10B2 breakers on B01. **CRITICAL TASK – Trip the Reactor prior to completion of SPTAs**
8	mfED02 mfEG06B	C ALL	After the Reactivity Safety Function is addressed a Loss of Offsite Power will occur. DG "B" will trip when it starts. **40EP-9EO07, Loss of Offsite Power/Loss of Forced Circulation**
9	cmCPCC08SPAP01_5	C RO/SRO	Spray Pond pump "A" fails to auto start. **CRITICAL TASK – Starts SPA-P01 prior to DG "A" running > 3 minutes with no cooling water.** **CRITICAL TASK – Establish feed to at least one SG using AFN-P01.**
End point	Once the crew has verified that Natural Circulation flow has been established		

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

Turnover

Plant conditions:

Unit 1 is at 100% power.

The core is presently at 250 EFPD.

Risk Management Action Level is ORANGE.

Train B is protected equipment.

AF 'B' and AF 'N' are protected.

CS 'B' is protected.

PC is NOT recircing the RWT.

Unit 2 is supplying the Aux Steam cross-tie header.

I&C have completed testing on the SBCS master controller SGN-PIC-1010 and it can be returned to automatic operation.

Equipment out of service:

Auxiliary Feedpump 'A' (AFA-P01) is tagged out due to a noisy bearing.

CS 'A' is tagged out for scheduled maintenance.

Planned shift activities:

Shift SGN-PIC-1010 from manual to automatic mode of operation.

Facility: Palo Verde		Date of Exam: 3/16-3/24/2012																
APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)			
		1			2			3			4							
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U	
RO	RX													0	1	1	0	
	NOR						1,5							2	1	1	1	
R1, R5, R9, R11, R13	I/C		2,4,5,8				2,4,6							7	4	4	2	
	MAJ		7				7							2	2	2	1	
	TS													0	0	2	2	
RO	RX					5								1	1	1	0	
	NOR			1										1	1	1	1	
R2,R10, R12, R14	I/C			3,5,6,9		3,8,9								7	4	4	2	
	MAJ			7		7								2	2	2	1	
	TS													0	0	2	2	
RO	RX													0	1	1	0	
	NOR						1,5			1				3	1	1	1	
R3, R7	I/C		2,4,5,8				2,4,6			3,8,9				10	4	4	2	
	MAJ		7				7			6				3	2	2	1	
	TS													0	0	2	2	
RO	RX					5								1	1	1	0	
	NOR			1						1				2	1	1	1	
R4, R6, R8	I/C			3,5,6,9		3,8,9				3,8,9				10	4	4	2	
	MAJ			7		7				6				3	2	2	1	
	TS													0	0	2	2	
RO	RX													0	1	1	0	
	NOR									1				1	1	1	1	
R15	I/C		2,4,5,8							3,8,9				7	4	4	2	
	MAJ		7							6				2	2	2	1	
	TS													0	0	2	2	

Facility: Palo Verde		Date of Exam: 3/16-3/24/2012															
APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-U	RX													0	1	1	0
	NOR	1						1						2	1	1	1
U1, U5	I/C	2,3,4,5,6,8,9						2,3,4,5,7,8,9						14	4	4	2
	MAJ	7						6						2	2	2	1
	TS	4,5,6						3,5						5	0	2	2
SRO-U	RX													0	1	1	0
	NOR				1,5			1						3	1	1	1
U2, U3	I/C				2,3,4,6,8,9			2,3,4,5,7,8,9						13	4	4	2
	MAJ				7			6						2	2	2	1
	TS				3,4			3,5						4	0	2	2
SRO-U	RX													0	1	1	0
	NOR						1,5	1						3	1	1	1
U4	I/C						2,4,6	2,3,4,5,7,8,9						10	4	4	2
	MAJ						7	6						2	2	2	1
	TS							3,5						2	0	2	2
SRO-I	RX													0	1	1	0
	NOR	1			1,5									3	1	1	1
I1, I2, I3, I4, I5	I/C	2,3,4,5,6,8,9			2,3,4,6,8,9				2,4,5,7					17	4	4	2
	MAJ	7			7				6					3	2	2	1
	TS	4,5,6			3,4									5	0	2	2
SRO-I	RX					5								1	1	1	0
	NOR	1						1						2	1	1	1
I6	I/C	2,3,4,5,6,8,9				3,8,9		2,3,4,5,7,8,9						17	4	4	2
	MAJ	7				7		6						3	2	2	1
	TS	4,5,6						3,5						5	0	2	2

Facility: Palo Verde		Date of Exam: 3/16-3/24/2012															
APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-I	RX													0	1	1	0
	NOR			1	1,5									3	1	1	1
I7	I/C			3,5, 6,9	2,3,4 ,6,8, 9				2,4,5 ,7					14	4	4	2
	MAJ			7	7				6					3	2	2	1
	TS				3,4									2	0	2	2
Scenario 4(spare) totals	RX											5			1	1	0
	NOR										1,5		1,5		1	1	1
	I/C											3, 8,9	2,4,8		4	4	2
	MAJ										7	7	7		2	2	1
	TS										2,3				0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.