Facility: **Beaver Valley Unit 2** Date Of Exam: **Weeks of 8/16 & 8/23 2010**

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	1	2	2				1	2			1	9	0			0	0	
	Tier Totals	4	5	5				4	5			4	27	0			0	0	
2. Plant Systems	1	3	3	3	3	2	1	3	3	2	2	3	28	0			0	0	
	2	1	1	0	2	1	1	1	1	1	0	1	10	0		0	0	0	
	Tier Totals	4	4	3	5	3	2	4	4	3	2	4	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: **Beaver Valley Unit 2**

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
Q1 000007 Reactor Trip - Stabilization - Recovery / 1	X						EK1.02 - Shutdown margin	3.4	1
Q2 000008 Pressurizer Vapor Space Accident / 3		X					AK2.03 - Controllers and positioners	2.5	1
Q3 000009 Small Break LOCA / 3		X					EK2.03 - S/Gs	3.0	1
Q4 000015/000017 RCP Malfunctions / 4				X			AA1.03 - Reactor trip alarms, switches, and indicators	3.7*	1
Q5 000022 Loss of Rx Coolant Makeup / 2					X		AA2.01 - Whether charging line leak exists	3.2	1
Q6 000025 Loss of RHR System / 4			X				AK3.02 - Isolation of RHR low-pressure piping prior to pressure increase above specified level	3.3	1
Q7 000027 Pressurizer Pressure Control System Malfunction / 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
Q8 000029 ATWS / 1	X						EK1.05 - definition of negative temperature coefficient as applied to large PWR coolant systems	2.8	1
Q9 000040 Steam Line Rupture - Excessive Heat Transfer / 4	X						AK1.03 - RCS shrink and consequent depressurization	3.8	1
Q10 000054 Loss of Main Feedwater / 4					X		AA2.07 - Reactor trip first-out panel indicator	3.4*	1
Q11 000055 Station Blackout / 6					X		EA2.02 - RCS core cooling through natural circulation cooling to S/G cooling	4.4	1
Q12 000056 Loss of Off-site Power / 6			X				AK3.01 - Order and time to initiation of power for the load sequencer	3.5	1
Q13 000062 Loss of Nuclear Svc Water / 4			X				AK3.04 - Effect on the nuclear service water discharge flow header of a loss of CCW	3.5	1
Q14 000065 Loss of Instrument Air / 8				X			AA1.02 - Components served by instrument air to minimize drain on system	2.6	1
Q15 000077 Generator Voltage and Electric Grid Disturbances / 6				X			AA1.03 - Voltage regulator controls	3.8	1
Q16 W/E04 LOCA Outside Containment / 3						X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	1

PWR RO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q17 W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.7	1
Q18 W/E11 Loss of Emergency Coolant Recirc. / 4						X	2.4.6 - Knowledge of EOP mitigation strategies.	3.7	1
K/A Category Totals:	**3**	**3**	**3**	**3**	**3**	**3**	**Group Point Total:**		**18**

PWR RO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q19 000003 Dropped Control Rod / 1	X						AK1.15 - Definition and application of power defect	2.8	1
Q20 000036 Fuel Handling Accident / 8			X				AK3.02 - Interlocks associated with fuel handling equipment	2.9	1
Q21 000060 Accidental Gaseous Radwaste Rel. / 9					X		AA2.02 - The possible location of a radioactive-gas leak, with the assistance of PEO, health physics and chemistry personnel	3.1	1
Q22 000067 Plant Fire On-site / 9					X		AA2.16 - Vital equipment and control systems to be maintained and operated during a fire	3.3	1
Q23 W/E02 SI Termination / 3				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.0	1
Q24 W/E03 LOCA Cooldown - Depress. / 4						X	2.4.18 - Knowledge of the specific bases for EOPs.	3.3	1
Q25 W/E07 Inad. Core Cooling / 4			X				EK3.4 - RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated	3.3	1
Q26 W/E09 Natural Circ. / 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	3.6	1
Q27 W/E16 High Containment Radiation / 9		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	2.6	1
K/A Category Totals:	**1**	**2**	**2**	**1**	**2**	**1**	**Group Point Total:**		**9**

PWR RO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q28 003 Reactor Coolant Pump		X										K2.01 - RCPS	3.1	1
Q29 003 Reactor Coolant Pump											X	2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
Q30 004 Chemical and Volume	X											K1.22 - BWST	3.4	1
Q31 005 Residual Heat Removal					X							K5.01 - Nil ductility transition temperature (brittle fracture)	2.6	1
Q32 006 Emergency Core Cooling								X				A2.07 - Loss of heat tracing	2.8	1
Q33 007 Pressurizer Relief/Quench Tank				X								K4.01 - Quench tank cooling	2.6	1
Q34 008 Component Cooling Water											X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	4.1	1
Q35 008 Component Cooling Water								X				A2.04 - PRMS alarm	3.3	1
Q36 010 Pressurizer Pressure		X										K2.01 - PZR heaters	3.0	1
Q37 010 Pressurizer Pressure			X									K3.01 - RCS	3.8	1
Q38 012 Reactor Protection						X						K6.01 - Bistables and bistable test equipment	2.8	1
Q39 013 Engineered Safety Features Actuation			X									K3.01 - Fuel	4.4	1
Q40 013 Engineered Safety Features Actuation											X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
Q41 022 Containment Cooling	X											K1.04 - Chilled water	2.9*	1
Q42 026 Containment Spray	X											K1.02 - Cooling water	4.1	1
Q43 039 Main and Reheat Steam					X							K5.05 - Bases for RCS cooldown limits	2.7	1
Q44 059 Main Feedwater										X		A4.12 - Initiation of automatic feedwater isolation	3.4	1
Q45 059 Main Feedwater				X								K4.13 - Feedwater fill for S/G upon loss of RCPs	2.9	1
Q46 061 Auxiliary/Emergency Feedwater								X				A2.07 - Air or MOV failure	3.4	1
Q47 062 AC Electrical Distribution							X					A1.01 - Significance of D/G load limits	3.4	1
Q48 063 DC Electrical Distribution										X		A4.02 - Battery voltage indicator	2.8*	1

PWR RO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q49 063 DC Electrical Distribution			X									K3.02 - Components using DC control power	3.5	1
Q50 064 Emergency Diesel		X										K2.02 - Fuel oil pumps	2.8*	1
Q51 064 Emergency Diesel									X			A3.06 - Start and stop	3.3	1
Q52 073 Process Radiation				X								K4.01 - Release termination when radiation exceeds setpoint	4.0	1
Q53 076 Service Water							X					A1.02 - Reactor and turbine building closed cooling water temperatures	2.6*	1
Q54 078 Instrument Air									X			A3.01 - Air pressure	3.1	1
Q55 103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	1
K/A Category Totals:	**3**	**3**	**3**	**3**	**2**	**1**	**3**	**3**	**2**	**2**	**3**	**Group Point Total:**		**28**

PWR RO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q56 001 Control Rod Drive									X			A3.02 - Rod height	3.7	1
Q57 028 Hydrogen Recombiner and Purge Control								X				A2.03 - The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment	3.4	1
Q58 029 Containment Purge							X					A1.02 - Radiation levels	3.4	1
Q59 035 Steam Generator	X											K1.01 - MFW/AFW systems	4.2	1
Q60 045 Main Turbine Generator					X							K5.17 - Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases	2.5*	1
Q61 068 Liquid Radwaste						X						K6.10 - Radiation monitors	2.5	1
Q62 071 Waste Gas Disposal				X								K4.04 - Isolation of waste gas release tanks	2.9	1
Q63 072 Area Radiation Monitoring											X	2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.2	1
Q64 075 Circulating Water		X										K2.03 - Emergency/essential SWS pumps	2.6*	1
Q65 086 Fire Protection				X								K4.06 - CO2	3.0	1
K/A Category Totals:	**1**	**1**	**0**	**2**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**Group Point Total:**		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Facility: Beaver Valley Unit 2 — **Form ES-401-3**

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.39	**Q66** Knowledge of conservative decision making practices.	3.6	1
	2.1.43	**Q67** Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.	4.1	1
		Category Total:		**2**
Equipment Control	2.2.25	**Q68** Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	3.2	1
	2.2.38	**Q69** Knowledge of conditions and limitations in the facility license.	3.6	1
	2.2.41	**Q70** Ability to obtain and interpret station electrical and mechanical drawings.	3.5	1
		Category Total:		**3**
Radiation Control	2.3.7	**Q71** Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	1
	2.3.15	**Q72** Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1
		Category Total:		**2**
Emergency Procedures/Plan	2.4.23	**Q73** Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	3.4	1
	2.4.25	**Q74** Knowledge of fire protection procedures.	3.3	1
	2.4.45	**Q75** Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	1
		Category Total:		**3**
		Generic Total:		**10**

Facility: **Beaver Valley Unit 2** Date Of Exam: **Weeks of 8/16 & 8/23 2010**

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	3			3	6
	2	0	0	0				0	0			0	0	2			2	4
	Tier Totals	0	0	0				0	0			0	0	5			5	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	1	2	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: **Beaver Valley Unit 2**

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
Q76 000011 Large Break LOCA / 3					X		EA2.01 - Actions to be taken, based on RCS temperature and pressure - saturated and superheated	4.7	1
Q77 000026 Loss of Component Cooling Water / 8					X		AA2.06 - The length of time after the loss of CCW flow to a component before that component may be damaged	3.1*	1
Q78 000038 Steam Gen. Tube Rupture / 3						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.7	1
Q79 000057 Loss of Vital AC Inst. Bus / 6						X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.8	1
Q80 000058 Loss of DC Power / 6					X		AA2.03 - DC loads lost; impact on to operate and monitor plant systems	3.9	1
Q81 W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4						X	2.2.37 - Ability to determine operability and/or availability of safety related equipment.	4.6	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**3**	**3**	**Group Point Total:**		**6**

PWR SRO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q82 000028 Pressurizer Level Malfunction / 2						X	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
Q83 000032 Loss of Source Range NI / 7					X		AA2.06 - Confirmation of reactor trip	4.1*	1
Q84 000074 Inad. Core Cooling / 4						X	2.4.21 - Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.6	1
Q85 W/E15 Containment Flooding / 5					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.3	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**2**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Facility: **Beaver Valley Unit 2**

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
Q86 005 Residual Heat Removal								X				A2.04 - RHR valve malfunction	2.9	1
Q87 022 Containment Cooling											X	2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	4.6	1
Q88 026 Containment Spray								X				A2.04 - Failure of spray pump	4.2	1
Q89 061 Auxiliary/Emergency Feedwater								X				A2.05 - Automatic control malfunction	3.4*	1
Q90 062 AC Electrical Distribution											X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	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: **Beaver Valley Unit 2**

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
Q91 011 Pressurizer Level Control											X	2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	4.1	1
Q92 015 Nuclear Instrumentation								X				A2.02 - Faulty or erratic operation of detectors or compensating components	3.5*	1
Q93 033 Spent Fuel Pool Cooling								X				A2.01 - Inadequate SDM	3.5	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**Group Point Total:**		**3**

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Facility: Beaver Valley Unit 2 **Form ES-401-3**

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.35	**Q94** Knowledge of the fuel-handling responsibilities of SROs.	3.9	1
	2.1.40	**Q95** Knowledge of refueling administrative requirements.	3.9	1
		Category Total:		2
Equipment Control	2.2.17	**Q96** Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination woth the transmission system operator.	3.8	1
		Category Total:		1
Radiation Control	2.3.13	**Q97** Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.8	1
	2.3.14	**Q98** Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.8	1
		Category Total:		2
Emergency Procedures/Plan	2.4.22	**Q99** Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4.4	1
	2.4.28	**Q100** Knowledge of procedures relating to a security event (non-safeguards information).	4.1	1
		Category Total:		2
		Generic Total:		7

Facility: **Beaver Valley Unit 2** Date of Exam **Weeks of 8/16 & 8/23 2010** Operating Test No.: **NRC 2LOT7**

Tier / Group	Randomly Selected K/A	Reason for Rejection
		RO OUTLINE
1/1	027 2.2.18	*ES-401 D.1.b requires exclusion of generic K/As for Tier 1 & 2. These generic K/As were not suppressed and therefore were not automatically omitted using PWROG Random Generator (manually reselected from same generic group)
1/1	W/E04 2.1.42	*Same as above.
1/1	W/E11 2.4.12	*Same as above.
1/2	W/E03 2.4.16	*Same as above.
2/1	003 2.4.32	*Same as above.
2/1	008 2.1.36	*Same as above.
2/1	013 2.1.8	*Same as above.
2/1	025.K6.01	Ice Condensers are not applicable to BVPS
2/1	073 K4.02	Letdown Isolation on High RCS Activity is not applicable to BVPS.
2/1	022 K1.02	SEC/Remote Monitoring Systems are not applicable to Containment Cooling at BVPS
2/2	027 K1.01	Containment Iodine Removal System is no longer applicable to BVPS Unit 2. During last refueling outage a plant modification was completed to use a passive sodium tetraborate system.
2/2	072 2.4.27	*Same as above.
2/2	072 2.4.34	The manually reselected K/A has no RO tasks associated with the Area Radiation Monitoring System performed outside of the control room, during an emergency.
2/2	086 A4.01	Fire Water Pumps are operated from BVPS Unit 1 and therefore are not operated or monitored from BVPS Unit 2. With concurrence from Chief Examiner this K/A was deselected on the basis Unit 2 RO discrimination is not applicable.
		SRO OUTLINE
1/1	057 2.4.25	*Same as above.
1/2	074 2.4.40	*Same as above.
2/1	022 2.2.6	*Same as above.
2/2	011 2.4.29	*Same as above.
2/1	025 A2.05	Ice Condensers are not applicable to BVPS

Facility: **Beaver Valley Unit 2** Date of Examination: **Weeks of 8/16 & 8/23 2010**

Examination Level **RO** ☒ **SRO** ☐ Operating Test Number: **2LOT7**

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R N	2.1.25 3.9 Ability to interpret reference materials, such as graphs, curves, tables, etc. 2AD-036 Perform SDM Calculation for At power condition and ONE inoperable Rod.
Conduct of Operations	R N	2.1.7 4.4 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. 2AD-030 Calculate the RCS initial void volume and final void volume (IAW 2OM-6.4.T, Response to Voids in the reactor vessel)
Equipment Control	R N	2.2.13 4.1 Knowledge of tagging and clearance procedures. 2AD-031 Prepare a clearance Tagout for Quench Spray Pump 2QSS*P21B
Radiation Control	R D	2.3.11 3.8 Ability to control radiation releases. 2AD-010 Determine GW Discharge Bleed Flowrate
Emergency Procedures/Plan		N/A

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: **Beaver Valley Unit 2** Date of Examination: **Weeks of 8/16 & 8/23 2010**

Examination Level **RO** ☐ **SRO** ☒ Operating Test Number: **2LOT7**

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, N	2.1.25 4.2 Ability to interpret reference materials, such as graphs, curves, tables, etc. 2AD-035 Perform SDM Calculation for At power condition and ONE inoperable Rod; Determine Tech Spec Applicability.
Conduct of Operations	R, M	2.1.3 3.9 Knowledge of shift or short-term relief turnover practices. 2AD-024 Determine Availability for call-in (3 ROs)
Equipment Control	R, N	2.2.37 4.6 Ability to determine operability and/or availability of safety related equipment. 2AD-033 Determine Compensatory Actions for Low CO_2 Tank Level
Radiation Control	R, D	2.3.4 3.7 Knowledge of radiation exposure limits under normal or emergency conditions. 2AD-014 Approve Emergency Exposure
Emergency Procedures/Plan	S, N	2.4.41 4.6 Knowledge of the emergency action level thresholds and classifications. 2AD-034 Classify an E-Plan event (Scenario Specific) and Complete Initial Notification Form

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: Beaver Valley Unit 2 Date of Examination: Weeks of 8/16 & 8/23 2010
Exam Level: RO ☒ SRO(I) ☐ SRO(U) ☐ Operating Test No.: 2LOT7

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. RCS Dilution (2CR-089)	S, D	1
b. Transfer from Hot Leg to Cold Leg Recirculation (2CR-560)	S, D, A, E, EN	3
c. Place Excess Letdown in Service (2CR-56)	S, D	2
d. Respond to a Reactor Coolant Pump #1 Seal Failure (2CR-040)	S, D, L	4P
e. Transfer from Bypass to Main Feed Regulating Valve (2CR-520)	S, N, A	4S
f. Synchronize and Load 2-1 EDG (2CR-524)	S, D, A, EN	6
g. Primary Component Cooling Water Pump (2CCP*21A) Test (2CR-157)	S, N, L	8
h. Verify CREVS Actuation (2CR-599)	S, N, E, A	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Transferring Power for 2RHS-MOV702A (2PL-061)	D, E	4P
j. Locally Throttle AFW Valves during ECA - 0.0 (2PL-150)	N, E, R	4S
k. Test The EDG UV Start Relay (2PL-549)	D, E, A	6

@ All RO and SRO 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: Beaver Valley Unit 2 Date of Examination: Weeks of 8/16 & 8/23 2010
Exam Level: RO ☐ SRO(I) ☒ SRO(U) ☐ Operating Test No.: 2LOT7

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. RCS Dilution (2CR-089)	S, D	1
b. Transfer from Hot Leg to Cold Leg Recirculation (2CR-560)	S, D, A, E, EN	3
c. Place Excess Letdown in Service (2CR-56)	S, D	2
d. Respond to a Reactor Coolant Pump #1 Seal Failure (2CR-040)	S, D, L	4P
e. Transfer from Bypass to Main Feed Regulating Valve (2CR-520)	S, N, A	4S
f. Synchronize and Load 2-1 EDG (2CR-524)	S, D, A, EN	6
g.		
h. Verify CREVS Actuation (2CR-599)	S, N, E, A	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Transferring Power for 2RHS-MOV702A (2PL-061)	D, E	4P
j. Locally Throttle AFW Valves during ECA - 0.0 (2PL-150)	N, E, R	4S
k. Test The EDG UV Start Relay (2PL-549)	D, E, A	6

@ All RO and SRO 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: **FENOC BVPS Unit 2** Scenario No.: 4 Op Test No.: 2LOT7 NRC
Examiners: _____ Candidates: _____ SRO
_____ _____ ATC
_____ _____ BOP

Initial Conditions: **IC 214:** Reactor power ~E-6 amps, BOL, Equ. Xe Conditions, CB "D" @ 101 steps, RCS boron - 1851 ppm, Condensate Polishing Air Compressor - OOS.

Turnover: Raise power to above the POAH (3-5%)

Critical Tasks:
E-1.C, Trip RCPs
E-0.I, Manually Start HHSI Pump
ECA-1.1.B, Makeup to RWST

Event No.	Malf. No.	Event Type	Event Description
1		R(ATC) N(BOP/SRO)	Raise Reactor power to 3-5%
2	BST-CSS035 BST-CSS036	C(ATC/SRO) SRO TS	2RSS-P21D, Recirculation Spray Pump Seal failure 2RSS-P21D seal tank level low 2RSS-P21D seal tank level lo lo
3	FLX-CSS05	C(BOP/SRO) SRO TS	500 gpm suction leak to the "A" Quench Spray Pump.
4	PMP-CAS003	C(BOP/SRO)	Station Air compressor Trip/auto start failure of standby
5	FLX-CAS10	C(ALL)	Instrument Air Header leak – requires manual reactor trip
6	RCS02C	M(ALL)	5000 gpm SBLOCA on Loop C upon reactor trip
7	BKR-HIV08 DSG01B	C(BOP/SRO)	Inadvertent trip of 2DF feeder brk on Rx trip. 2-2 EDG Auto start failure with subsequent trip
8	PPL07A	C(ATC/SRO)	Standby HHSI pump fails to auto start (manual start required).
9	LOA-LOV072	C(ALL)	Loss of 2MCC-E11, (Both Trains of Transfer to Cold Leg Recirculation are unavailable – ECA-1.1 entry required)

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

Facility: **FENOC BVPS Unit 2** Scenario No.: 3 Op Test No.: 2LOT7 NRC

Examiners: _____ Candidates: _____ SRO

_____ _____ ATC

_____ _____ BOP

Initial Conditions: **IC-213** MOL, 100 % power Equ Xe, Rods Bank D @ 230 steps, RCS Boron - 883 PPM, Condensate Polishing Air Compressor - OOS.

Turnover: Maintain current plant conditions

Critical Tasks:

FR-S.1.A, Crew isolates the main turbine from the SG's
FR-S.1.C, Crew inserts negative reactivity into the core by inserting RCCAs
E-2.A, Crew isolates/directs isolation of faulted SG

Event No.	Malf. No.	Event Type	Event Description
1	XMT-MSS043A	I(ALL) SRO T.S.	2MSS*PT447 fails LOW, Rods Auto insert, Rx power rises due to cold Feedwater, Power reduction required.
2		R(ATC) N(BOP/SRO)	Emergency Power reduction
3	XMT-RCS030A	I(ATC/SRO) SRO T.S.	2RCS*PT444 drifts HIGH, Pzr pressure decreases, manual control of Pzr pressure required.
4	FLX-CFW31	M(ALL)	4500 gpm Feedwater leak inside cnmt on "A" S/G
5	PPL01A PPL01B	M(ALL)	ATWS – Failure of auto/manual Rx trip
6	EHC03B EHC01B	C(BOP/SRO)	Incomplete turbine trip, requires manual Steamline isolation actuation
7	VLV-MSS003A PPL10A PPL10B	C(BOP/SRO)	Auto MSLI Isolation actuation failure with 2MSS-AOV101A failing to close on a manual MSLI actuation, manual isolation required.
8			

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

Facility: **FENOC BVPS Unit 2** Scenario No.: 2 Op Test No.: 2LOT7 NRC
Examiners: _____ Candidates: _____ SRO
_____ _____ ATC
_____ _____ BOP

Initial Conditions: **IC 212**: 10% power, BOL, Equ. XE Conditions, CB "D" @ 118 steps, RCS boron - 1854 ppm, Condensate Polishing Air Compressor - OOS.

Turnover: Raise power to 15% to S/U main turbine.

Critical Tasks: **E-3.A, Isolate Ruptured SG**
E-3.B, Cooldown RCS
E-3.C, Depressurize RCS

Event No.	Malf. No.	Event Type	Event Description
1		R(ATC) N(SRO/BOP)	Normal power increase to 15% IAW 2OM-52.4.A
2	RCS04B	C(ALL) SRO TS	SG 21B Tube Leak
3	CNH MSS03A	C (ATC/SRO) SRO TS	SG 21B atmospheric dump valve fails open.
4	NIS08A	I(ALL) SRO TS)	N41 Power Range Instrument fuse blown
5	RCP06B RCP01B	C (ATC/SRO)	21B RCP high vibration (Manual RCP trip required) Manual reactor trip
6	RCS04B	M (ALL)	21B SG Tube Rupture
7	CNH PCS07A	I (BOP/SRO)	Condenser steam dumps fail closed.(Requires cooldown with 21A and 21C Atmospheric Steam Dumps
8	VLV-MSS057A	C (BOP/SRO)	2SDS-AOV129A failed open, requires RNO actions for S/G isolation.

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

Facility: **FENOC BVPS Unit 2** Scenario No.: 1 Op Test No.: 2LOT7 NRC

Examiners: _____ Candidates: _____ SRO

_____ _____ ATC

_____ _____ BOP

Initial Conditions: **IC 216**: 61% power, MOL, Equ. Xe Conditions, CB "D" @ 152 steps, RCS boron – 1044 ppm, Condensate Polishing Air Compressor - OOS.

Turnover: Maintain current power level.

Critical Tasks:
E-0.A, Auto Rx Trip failure
E-0.H, Start LHSI Pumps
E-0.E, Manually Initiate CIB
ES-1.3.A, Transfer to Cold Leg Recirc

Event No.	Malf. No.	Event Type	Event Description
1	XMT-RCS054A	I(ATC/SRO) SRO TS	Loop 1 Tcold RTD fails low
2	PMP-CFW004	C(BOP/SRO)	2FWS*P21A pump trip.(Power reduction required)
3		R(ATC) N(SRO/BOP)	Power reduction to <50%
4	FLX-CCP34 PMP-RCP003	C(ALL) SRO TS	CCP supply leak to 2RCS*P21B (10 minute ramp to 450 gpm leads to an automatic RCP trip).
5	PPL01A PPL01B	C(ATC) (SRO)	Auto Reactor Trip failure (manual available)
6	RCS03B	M(ALL)	B Loop Large break LOCA
7	PPL07A PPL07B	C(ATC) (SRO)	Both low head SI pumps fail to auto start (manual start available).
8	PPL09A PPL09B	C(BOP) (SRO)	Auto CIB failure (manual available)
9	SIS01 PCS084 PCS085 PCS087	C(ALL)	5000 gpm RWST leak Auto Transfer to Cold Leg Recirc failure (requires manually aligning components)

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