

Facility: <b>Susquehanna Steam Electric Station</b>														Date of Exam: <b>12 to 22 December 2005</b>					
Tier	Group	RO K/A Category Points												SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total			
1. Emergency & Abnormal Plant Evolutions	1	4	3	3				4	3				3	20	4	3	7		
	2	1	2	1				1	1				1	7	2	1	3		
	Tier Totals	5	5	4	N/A			5	4	N/A			4	27	6	4	10		
2. Plant Systems	1	3	2	2	3	2	2	3	3	2	2	2	26	3	2	5			
	2	1	1	1	1	1	1	1	1	2	1	1	12	1	1	3			
	Tier Totals	4	3	3	4	3	3	4	4	4	3	3	38	5	3	8			
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					2		3		2		3				2	2	2	1	

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  $\pm 1$  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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, 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.
- e. 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.
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. 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.

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Tier	Group	RO K/A Category Points												
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	TOTAL	
1. Emergency & Abnormal Plant Evolutions	1	4	3	3				4	3				3	20
	2	1	2	1				1	1				1	7
	Tier Totals	5	5	4				5	4				4	27
2. Plant Systems	1	3	2	2	3	2	2	3	3	2	2	2	26	
	2	1	1	1	1	1	1	1	1	2	1	1	12	
	Tier Totals	4	3	3	4	3	3	4	4	4	3	3	38	
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	
					2		3		2		3			

## Note:

1. Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the "Tier Totals" in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding SRO sampling.
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  $\pm 1$  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. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system or evolution unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. \* The generic (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. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled "K" and "A." Use duplicate pages for RO and SRO-only exams. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
8. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (RO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
<b><u>Question 1</u></b> 295001 Partial or Complete Loss of Forced Core Flow Circulation		X					<b>AK2. Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following:</b> AK2.07 Core flow indication	3.4	1
<b><u>Question 2</u></b> 295003 Partial or Complete Loss of A.C. Power			X				<b>AK3. Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER :</b> AK3.06 Containment isolation	3.7	1
<b><u>Question 3</u></b> 295004 Partial or Complete Loss of D.C. Power	X						<b>AK1. Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER:</b> AK1.05 Loss of breaker protection	3.3	1
<b><u>Question 4</u></b> 295004 Partial or Complete Loss of D.C. Power						X	2.2.30 Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area / communication with fuel storage facility / systems operated from the control room in support of fueling operations / and supporting instrumentation.	3.5	1
<b><u>Question 5</u></b> 295005 Main Turbine Trip		X					<b>AK2. Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following:</b> AK2.04 Main generator protection	3.3	1
<b><u>Question 6</u></b> 295006 SCRAM					X		<b>AA2. Ability to determine and/or interpret the following as they apply to SCRAM :</b> AA2.04 Reactor pressure	4.1	1
<b><u>Question 7</u></b> 295016 Control Room Abandonment			X				<b>AK3. Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT :</b> AK3.03 Disabling control room controls	3.5	1

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<b><u>Question 8</u></b> 295018 Partial or Complete Loss of Component	X						<b>AK1. Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER :</b> AK1.01 Effects on component/system operations	3.5	1
<b><u>Question 9</u></b> 295019 Partial or Complete Loss of Instrument Air				X			<b>AA1. Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR :</b> AA1.03 Instrument air compressor power supplies	3.0	1
<b><u>Question 10</u></b> 295021 Loss of Shutdown Cooling					X		<b>AA2. Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING:</b> AA2.07 Reactor recirculation flow	2.9	1
<b><u>Question 11</u></b> 295023 Refueling Accidents	X						<b>AK1. Knowledge of the operational implications of the following concepts as they apply to REFUELING ACCIDENTS :</b> AK1.01 Radiation exposure hazards	3.6	1
<b><u>Question 12</u></b> 295024 High Drywell Pressure						X	2.3.2 Knowledge of facility ALARA program.	2.5	1
<b><u>Question 13</u></b> 295025 High Reactor Pressure					X		<b>EA2. Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE:</b> EA2.03 Suppression Pool Temperature	3.9	1
<b><u>Question 14</u></b> 295026 Suppression Pool High Water Temperature	X						<b>EK1. Knowledge of the operational implications of the following concepts as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE:</b> EK1.02 Steam Condensation	3.5	1
<b><u>Question 15</u></b> 295028 High Drywell Temperature			X				<b>EK3. Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE:</b> EK3.02 RPV flooding	3.5	1

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<b>Question 16</b> 295030 Low Suppression Pool Water Level				X			<b>EA1. Ability to operate and/or monitor the following as they apply to LOW SUPPRESSION POOL WATER LEVEL:</b> EA1.06 Condensate storage and transfer (make-up to the suppression pool): Plant-Specific	3.6	1
<b>Question 17</b> 295031 Reactor Low Water Level		X					<b>EK2. Knowledge of the interrelations between REACTOR LOW WATER LEVEL and the following:</b> EK2.13 ARI/RPT/ATWS: Plant-Specific	4.1	1
<b>Question 18</b> 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown						X	2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	1
<b>Question 19</b> 295038 High Off-Site Release Rate				X			<b>EA1. Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE:</b> EA1.07 Control room ventilation: Plant- Specific	3.6	1
<b>Question 20</b> 600000 Plant Fire On Site				X			<b>AA1 Ability to operate and / or monitor the following as they apply to PLANT FIRE ON SITE:</b> AA1.06 Fire alarm	3.0	1
<b>K/A Category Totals:</b>	4	3	3	4	3	3	<b>Group Point Total:</b>	<b>20</b>	

ES-401		BWR Examination Outline						Form ES-401-1	
Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (RO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
<b>Question 21</b> 295008 High Reactor Water Level						X	2.1.20 Ability to execute procedure steps.	4.3	1
<b>Question 22</b> 295009 Low Reactor Water Level	X						<b>AK1. Knowledge of the operational implications of the following concepts as they apply to LOW REACTOR WATER LEVEL :</b> AK1.02 Recirculation pump net positive suction head: Plant-Specific	3.0	1
<b>Question 23</b> 295013 High Suppression Pool Temperature			X				<b>AK2. Knowledge of the interrelations between HIGH SUPPRESSION POOL TEMPERATURE and the following:</b> AK2.01 Suppression pool cooling	3.6	1
<b>Question 24</b> 295015 Incomplete SCRAM			X				<b>AK2. Knowledge of the interrelations between INCOMPLETE SCRAM and the following:</b> AK2.06 RSCS: Plant-Specific	2.6	1
<b>Question 25</b> 295034 Secondary Containment Ventilation High				X			<b>EK3. Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION :</b> EK3.03 Personnel Evacuation	4.0*	1
<b>Question 26</b> 295036 Secondary Containment High Sump					X		<b>EA1. Ability to operate and/or monitor the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL :</b> EA1.01 Secondary containment equipment and floor drain systems	3.2	1
<b>Question 27</b> 500000 High Containment Hydrogen Concentration						X	<b>EA2 Ability to determine and / or interpret the following as they apply to HIGH PRIMARY CONTAINMENT HYDROGEN CONCENTRATIONS:</b> EA2.04 Combustible limits for wetwell	3.3	1
K/A Category Point Totals:	1	2	1	1	1	1	Group Point Total:	7	

## Plant Systems - Tier 2 / Group 1 (RO)

System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b>Question 28</b> 203000 Residual Heat Removal /Low Pressure Coolant Injection: Injection Mode (Plant Specific)			X									<b>K3. Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) will have on following:</b> K3.03 Automatic depressurization logic.	4.2 *	1
<b>Question 29</b> 205000 Shutdown Cooling System (RHR Shutdown Cooling Mode)		X										<b>K2. Knowledge of electrical power supplies to the following:</b> K2.02 Motor operated valves.	2.5 *	1
<b>Question 30</b> 206000 High Pressure Coolant Injection System							X					<b>A1. Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including:</b> A1.01 Reactor water level: BWR-2,3,4	4.3 *	1
<b>Question 31</b> 206000 High Pressure Coolant Injection System											X	2.2.12 Knowledge of surveillance procedures.	3.0	1
<b>Question 32</b> 209001 Low Pressure Core Spray System				X								<b>K4. Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following:</b> K4.08 Automatic system initiation	3.8	1
<b>Question 33</b> 211000 Standby Liquid Control System				X								<b>K4. Knowledge of STANDBY LIQUID CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following:</b> K4.04 Indication of fault in explosive valve firing circuits	3.8	1

## Plant Systems - Tier 2 / Group 1 (RO)

System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b>Question 34</b> 211000 Standby Liquid Control System											X	2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	1
<b>Question 35</b> 212000 Reactor Protection System				X								<b>K4. Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following:</b> K4.09 Control rod insertion following RPS system electrical failure.	3.8 *	1
<b>Question 36</b> 212000 Reactor Protection System									X			<b>A3. Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including:</b> A3.01 Reactor Power	4.4 *	1
<b>Question 37</b> 215003 Intermediate Range Monitor System		X										<b>K2. Knowledge of electrical power supplies to the following:</b> K2.01 IRM channels/detectors	2.5 *	1
<b>Question 38</b> 215004 Source Range Monitor (SRM) System					X							<b>K5. Knowledge of the operational implications of the following concepts as they apply to SOURCE RANGE MONITOR (SRM) SYSTEM :</b> K5.03 Changing detector position	2.8	1



## Plant Systems - Tier 2 / Group 1 (RO)

System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b><u>Question 39</u></b> 215005 Average Power Range Monitor/Local Power Range Monitor							X					<b>A1. Ability to predict and/or monitor changes in parameters associated with operating the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM controls including:</b> A1.02 RPS status	3.9	1
<b><u>Question 40</u></b> 217000 Reactor Core Isolation Cooling System	X											<b>K1. Knowledge of the physical connections and/or cause effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the following:</b> K1.02 Nuclear boiler system	3.5	1
<b><u>Question 41</u></b> 218000 Automatic Depressurization System									X			<b>A3. Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including:</b> A3.01 ADS valve operation	4.2 *	1
<b><u>Question 42</u></b> 223002 Primary Containment Isolation System / Nuclear Steam Supply Shut-Off						X						<b>K6. Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF :</b> K6.02 D.C. electrical distribution	3.0	1

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Plant Systems - Tier 2 / Group 1 (RO)														
System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b>Question 43</b> 239002 Safety Relief Valves					X							<b>K5. Knowledge of the operational implications of the following concepts as they apply to AUTOMATIC DEPRESSURIZATION SYSTEM :</b> K5.02 Safety function of SRV operation	3.7	1
<b>Question 44</b> 259002 Reactor Water Level Control System			X									<b>K3. Knowledge of the effect that a loss or malfunction of the HIGH PRESSURE COOLANT INJECTION SYSTEM will have on following:</b> K3.03 Rod worth minimizer: BWR-2,3,4	2.7	1
<b>Question 45</b> 259002 Reactor Water Level Control System										X		<b>A4. Ability to manually operate and/or monitor in the control room:</b> A4.09TDRFP lockout reset: TDRFP. BWR-2,3,4	3.4	1
<b>Question 46</b> 261000 Standby Gas Treatment System	X											<b>K1. Knowledge of the physical connections and/or cause effect relationships between STANDBY GAS TREATMENT SYSTEM and the following:</b> K1.01 Reactor building ventilation system.	3.4	1
<b>Question 47</b> 262001 A.C. Electrical Distribution								X				<b>A2. Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:</b> A2.05 Bus grounds.	3.8	1

## Plant Systems - Tier 2 / Group 1 (RO)

System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b>Question 48</b> 262002 Uninterruptable Power Supply						X						<b>K6. Knowledge of the effect that a loss or malfunction of the following will have on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) :</b> K6.01 A.C. electrical power	2.7	1
<b>Question 49</b> 263000 D.C. Electrical Distribution	X											<b>K1. Knowledge of the physical connections and/or cause effect relationships between D.C. ELECTRICAL DISTRIBUTION and the following:</b> K1.02 Battery charger and battery	3.2	1
<b>Question 50</b> 264000 Emergency Generators (Diesel/Jet)							X					<b>A1. Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY GENERATORS (DIESEL/JET) controls including:</b> A1.09 Maintaining minimum load on emergency generator (to prevent reverse power)	3.0	1
<b>Question 51</b> 300000 Instrument Air System								X				<b>A2. Ability to (a) predict the impacts of the following on the INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:</b> A2.01 Air dryer and filter malfunctions	2.9	1

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Plant Systems - Tier 2 / Group 1 (RO)														
System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<u>Question 52</u> 300000 Instrument Air System										X		<b>A4. Ability to manually operate and / or monitor in the control room:</b> A4.01 Pressure gauges	2.6	1
<u>Question 53</u> 400000 Component Cooling Water System								X				<b>A2. Ability to (a) predict the impacts of the following on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:</b> A2.02 High/low surge tank level	2.8	1
K/A Category Point Totals:	3	2	2	3	2	2	3	3	2	2	2	Group Point Total:	26	

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Plant Systems - Tier 2 / Group 2 (RO)														
System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b>Question 54</b> 201001 Control Rod Drive Hydraulic System									X			<b>A3. Ability to monitor automatic operations of the CONTROL ROD DRIVE HYDRAULIC SYSTEM including:</b> A3.11 SDV level	3.5	1
<b>Question 55</b> 201002 Reactor Manual Control System	X											<b>K1. Knowledge of the physical connections and/or cause effect relationships between REACTOR MANUAL CONTROL SYSTEM and the following:</b> K1.04 Rod block monitor: Plant-Specific	3.5	1
<b>Question 56</b> 201004 Rod Sequence Control System (Plant Specific)									X			<b>A3. Ability to monitor automatic operations of the ROD SEQUENCE CONTROL SYSTEM (PLANT SPECIFIC) including:</b> A3.05 †Verification of proper function/ operability: BWR-4,5	3.5	1
<b>Question 57</b> 201006 Rod Worth Minimizer System (RWM)											X	2.2.26 Knowledge of refueling administrative requirements.	2.5	1
<b>Question 58</b> 202001 Recirculation System										X		<b>A4. Ability to manually operate and/or monitor in the control room:</b> A4.02 System valves	3.5	1
<b>Question 59</b> 202002 Recirculation flow Control System			X									<b>K3. Knowledge of the effect that a loss or malfunction of the RECIRCULATION FLOW CONTROL SYSTEM will have on following:</b> K3.01 Core flow	3.5	1

## Plant Systems - Tier 2 / Group 2 (RO)

System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
<b>Question 60</b> 204000 Reactor Water Cleanup System						X						<b>K6. Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER CLEANUP SYSTEM :</b> K6.01 Component cooling water systems	3.1	1
<b>Question 61</b> 214000 Rod Position Information System				X								<b>K4. Knowledge of ROD POSITION INFORMATION SYSTEM design feature(s) and/or interlocks which provide for the following:</b> K4.02 Thermocouple	2.5 *	1
<b>Question 62</b> 219000 RHR/LPCI: Torus/Suppression Pool Cooling Mode		X										<b>K2. Knowledge of electrical power supplies to the following:</b> K2.02 Pumps	3.1 *	1
<b>Question 63</b> 226001 RHR/LPCI: Containment Spray System								X				<b>A2. Ability to (a) predict the impacts of the following on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:</b> A2.03 Valve closures	3.1	1
<b>Question 64</b> 239001 Main and Reheat Steam System							X					<b>A1. Ability to predict and/or monitor changes in parameters associated with operating the MAIN AND REHEAT STEAM SYSTEM controls including:</b> A1.10 Reactor power.	3.6	1

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Plant Systems - Tier 2 / Group 2 (RO)																
System #	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#		
<u>Question 65</u> 288000 Plant Ventilation Systems					X							<b>K5. Knowledge of the operational implications of the following concepts as they apply to PLANT VENTILATION SYSTEMS:</b> K5.01 Airborne contamination control	3.1	1		
K/A Category Point Totals:	1	1	1	1	1	1	1	1	2	1	1	Group Point Total:	12			

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Tier	Group	SRO-ONLY Points				
		K	A	A2	G*	TOTAL
1. Emergency & Abnormal Plant Evolutions	1			4	3	7
	2			2	1	3
	Tier Totals			6	4	10
2. Plant Systems	1			3	2	5
	2	0	1	1	1	3
	Tier Totals	0	1	4	3	8
3. Generic Knowledge and Abilities Categories		1	2	3	4	7
		2	2	2	1	

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8. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.



## Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 (SRO)

E/APE # / Name / Safety Function		A 2	G	K/A Topic(s)	IR	#
<b>Question 76</b> 295003 Partial or Complete Loss of A.C. Power		X		<b>AA2. Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER :</b> AA2.02 Reactor power / pressure / and level	4.3*	1
<b>Question 77</b> 295006 SCRAM		X		<b>AA2. Ability to determine and/or interpret the following as they apply to SCRAM :</b> AA2.06 Cause of reactor SCRAM	3.8	1
<b>Question 78</b> 295016 Control Room Abandonment			X	2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4.0	1
<b>Question 79</b> 295023 Refueling Accidents		X		<b>AA2. Ability to determine and/or interpret the following as they apply to REFUELING ACCIDENTS:</b> AA2.05 †Entry conditions of emergency plan	4.6*	1
<b>Question 80</b> 295028 High Drywell Temperature		X		<b>EA2. Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE :</b> EA2.04 Drywell pressure.	4.2	1
<b>Question 81</b> 295030 Low Suppression Pool Water Level			X	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.8	1
<b>Question 82</b> 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or unknown			X	2.4.11 Knowledge of abnormal condition procedures.	3.6	1
<b>K/A Category Totals:</b>		<b>4</b>	<b>3</b>	<b>Group Point Total:</b>		<b>7</b>

ES-401		BWR Examination Outline				Form ES-401-1	
Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 (SRO)							
E/APE # / Name / Safety Function		A	G	K/A Topic(s)		IR	#
<b><u>Question 83</u></b> 295002 Loss of Main Condenser Vacuum		X		<b>AA2. Ability to determine and/or interpret the following as they apply to LOSS OF MAIN CONDENSER VACUUM :</b> AA2.01 Condenser vacuum/absolute pressure		3.1	1
<b><u>Question 84</u></b> 295017 High Off-Site Release Rate			X	2.4.6 Knowledge symptom based EOP mitigation strategies.		4.0	1
<b><u>Question 85</u></b> 295035 Secondary Containment High Differential Pressure		X		<b>EA2. Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL</b> EA2.02 †Off-site release rate: Plant-Specific		4.1	1
K/A Category Point Totals:				2	1	Group Point Total:	<b>3</b>

ES-401		BWR Examination Outline			Form ES-401-1	
Plant Systems - Tier 2 / Group 1 (SRO)						
System #		A 2		G	K/A Topic(s)	IR #
<b>Question 86</b> 215004 Source Range Monitor System		X			A2. Ability to (a) predict the impacts of the following on the SOURCE RANGE MONITOR (SRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.02 SRM inop condition	3.7 1
<b>Question 87</b> 261000 Standby Gas Treatment System		X			A2. Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.13 High secondary containment ventilation exhaust radiation	3.7 1
<b>Question 88</b> 262001 A.C. Electrical Distribution		X			A2. Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.03 Loss of off-site power.	4.3 1
<b>Question 89</b> 263000 D.C. Electrical Distribution				X	2.4.5 Knowledge of the organization of the operating procedures network for normal / abnormal / and emergency evolutions.	3.6 1
<b>Question 90</b> 264000 Emergency Generators (Diesel/Jet)				X	2.1.32 Ability to explain and apply system limits and precautions.	3.8 1
K/A Category Point Totals:		3		2	Group Point Total:	5

ES-401		BWR Examination Outline				Form ES-401-1	
Plant Systems - Tier 2 / Group 2 (SRO)							
System #		A 2		G	K/A Topic(s)	IR	#
<b>Question 91</b> 215002 Rod Block Monitor System		X			<b>A2. Ability to (a) predict the impacts of the following on the ROD BLOCK MONITOR SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:</b> A2.03 Loss of associated reference APRM channel: BWR-3,4,5	3.3	1
<b>Question 92</b> 216000 Nuclear Boiler Instrumentation				X	2.2.22 Knowledge of limiting conditions for operations and safety limits.	3.4	1
<b>Question 93</b> 234000 Fuel Handling			X		<b>A3. Ability to monitor automatic operations of the FUEL HANDLING EQUIPMENT including:</b> A3.01 †Crane/refuel bridge movement: Plant-Specific .	3.6	1
K/A Category Point Totals:					Group Point Total:	<b>3</b>	

ES 401		Generic Knowledge and Abilities Outline Tier 3			Form ES-401-3	
Facility: <u>Susquehanna Steam Electric Station</u>				Date of Exam: <u>12 to 22 December 2005</u>		
Category	<u>Question</u>	K/A#	Topic	RO		
				IR	#	
1. Conduct of Operations	<u>66</u>	2.1.21	Ability to obtain and verify controlled procedure copy.	3.1	1	
	<u>67</u>	2.1.32	Ability to explain and apply system limits and precautions.	3.4	1	
	Subtotal				2	
2. Equipment Control	<u>68</u>	2.2.11	Knowledge of the process for controlling temporary changes.	2.5	1	
	<u>69</u>	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	1	
	<u>70</u>	2.2.27	Knowledge of the refueling process.	2.6	1	
	Subtotal				3	
3. Radiation Control	<u>71</u>	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	1	
	<u>72</u>	2.3.2	Knowledge of facility ALARA program.	2.5	1	
	Subtotal				2	
4. Emergency Procedures/ Plan	<u>73</u>	2.4.6	Knowledge symptom based EOP mitigation strategies.	3.1	1	
	<u>74</u>	2.4.17	Knowledge of EOP terms and definitions.	3.1	1	
	<u>75</u>	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3.0	1	
	Subtotal				3	
Tier 3 Point Total					10	

Facility: Susquehanna Steam Electric StationDate of Exam: 12 to 22 December 2005

Category	<u>Question</u>	K/A#	Topic	SRO Only	
				IR	#
Conduct of Operations	<u>94</u>	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics / reactor behavior / and instrument interpretation.	4.4	1
	<u>95</u>	2.1.12	Ability to apply technical specifications for a system.	4.0	1
	Subtotal				2
Equipment Control	<u>96</u>	2.2.7	Knowledge of the process for conducting tests or experiments not described in the safety analysis report.	3.2	1
	<u>97</u>	2.2.19	Knowledge of maintenance work order requirements	3.1	1
	Subtotal				2
Radiation Control	<u>98</u>	2.3.6	Knowledge of the requirements for reviewing and approving release permits.	3.1	1
	<u>99</u>	2.3.9	Knowledge of the process for performing a containment purge.	3.4	1
	Subtotal				2
Emergency Procedures / Plan	<u>100</u>	2.4.11	Knowledge of abnormal condition procedures.	3.6	1
	Subtotal				1
Tier 3 Point Total					7

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO Tier 1 / Group 1	295004.2.2.1	Generic K/A to perform plant pre-startup or startup activities that could affect reactivity during a partial or full loss of DC power. This is not a reasonably foreseeable situation. Randomly selected 295004.2.2.5.
	295004.2.2.5	Generic K/A to demonstrate knowledge of making changes to the facility as described in the FSAR during a partial or full loss of DC power. These are unrelated such that writing an exam item that matches the K/A is probably not useful. Randomly selected 294004.2.2.6.
	295004.2.2.6	Generic K/A to demonstrate knowledge of making changes to the procedures as described in the FSAR during a partial or full loss of DC power. These are unrelated such that writing an exam item that matches the K/A is probably not useful. Randomly selected 294004.2.2.11.
	295004.2.2.11	Generic K/A to demonstrate knowledge of controlling temporary changes during a partial or full loss of DC power. These are unrelated such that writing an exam item that matches the K/A is probably not useful. Randomly selected 294004.2.2.30.
	295037.2.2.24	Generic K/A to demonstrate knowledge or ability during an ATWS while analyzing the affect of maintenance activities on LCO status. These are unrelated such that writing an exam item that matches the K/A is probably not useful. Randomly selected 295037.2.2.8.
	295037.2.2.8	Generic K/A to demonstrate knowledge or ability during an ATWS while determining if a proposed change, test, or experiment involves an un-reviewed safety question. These are unrelated such that writing an exam item that matches the K/A is probably not useful. Randomly selected 295037.2.2.2.
Question 21	RO Tier 1 / Group 2	Generic K/A to make accurate, clear and concise <u>verbal</u> reports. A written examination is not the optimum forum for testing this ability. Randomly selected 295008.2.2.20.
295008.2.1.17		
Question 66	RO Tier 3	Generic K/A to operate the plant phone, paging system and two-way radio. A written examination is not the optimum forum for testing this ability. Randomly selected 2.1.21.
2.1.16		

SRO Tier 1 / Group 1	Question 81	295030.2.2.32	EPE K/A concerning Low Suppression Pool Water Level and Generic K/A concerning effects of alteration on core configuration. These are unrelated topics such that writing an exam item that matches the K/A is probably not useful. Randomly selected 295030.2.2.33.
		295030.2.2.33	EPE K/A concerning Low Suppression Pool Water Level and Generic K/A concerning knowledge of control rod programming. These are unrelated topics such that writing an exam item that matches the K/A is probably not useful. Randomly selected 295030.2.2.4.
		295030.2.2.4	EPE K/A concerning Low Suppression Pool Water Level and Generic K/A concerning differences between units. According to Susquehanna Training Department, there are insignificant differences between the units. Therefore, it probably not possible to develop a meaningful exam item. Randomly selected 295030.2.2.25.
<b>The K/As above were rejected during written exam outline development. New K/As were selected using a random number generator available at <a href="http://www.random.org">http://www.random.org</a>. K/As were selected from the same tier, group and "E/APE #/Name/Safety Function" to maintain outline fidelity to the maximum extent possible.</b>			
Per telephone conversation with Susquehanna Steam Electric Station staff on Tuesday, 2 August 2005, the following corrections were made to the exam outline:			
<ul style="list-style-type: none"><li>• RO Tier 1/Group 1, 295037.2.2.24 – as noted above, this K/A was replaced during sample selection. However, the original, deselected K/A was not replaced in the exam outline. Question 18.</li><li>• RO Tier 2/Group 1, 205000.K2.02 – deleted "3.4-42" because this was a page number carried over from the original cut-n- paste from the K/A catalog. Corrected the K/A to read "Motor operated valves". Question 29.</li><li>• RO Tier 2/Group 2, 201004.A3.05 – deleted "3.7-33" because this was a page number carried over from the original cut-n- paste from the K/A catalog. Question 56.</li><li>• SRO Tier 1/Group 1, 295037.2.4.11 - deleted "4.1-24" because this was a page number carried over from the original cut-n-paste from the K/A catalog. Question 82.</li><li>• SRO Tier 1/Group 2, 295035.EA2.02 – deleted "4.1-22" because this was a page number carried over from the original cut-n-paste from the K/A catalog. Question 85.</li><li>• This form, 295008.2.2.17 – corrected the table above to correctly indicate that this K/A was sampled and rejected under RO Tier 1/Group 2 vice RO Tier 1/Group 1 as originally shown. Question 21.</li></ul>			
Also found and corrected two K/As that were incorrectly copied from the original random sample generator to the examination outline:			
<ul style="list-style-type: none"><li>• RO Tier 2/Group 1, 203000.K3.03 – Corrected the K/A to refer to RHR/LPCI. Question 28.</li><li>• RO Tier 2/Group 1, 205000.K2.02 – Corrected the K/A to read "Motor operated valves". Question 29.</li></ul>			
Question 44		Changed "HIGH PRESSURE COOLANT INJECTION SYSTEM" to "REACTOR WATER LEVEL CONTROL SYSTEM". Changed "Suppression pool level control" to "Rod worth minimizer". This corrects typographical errors in the original outline that were incorrectly copied from the original random	
RO Tier 2 / Group 1			



259002.K3.03		sample generator to the examination outline. 15 September 2005
RO Tier 2 / Group 1	Question 45	Changed "Suppression pool level" to "TDRFP lockout reset: TDRFP". This corrects a typographical error in the original outline that was incorrectly copied from the original random sample generator to the examination outline. 16 September 2005
	259002.A4.09	
	Question 46	Changed "MSIV LEAKAGE CONTROL SYSTEM" to "STANDY GAS TREATMENT SYSTEM". Changed "Main steam system: BWR-4,5,6(P-Spec)" to "Reactor building ventilation system". This corrects typographical errors in the original outline that were incorrectly copied from the original random sample generator to the examination outline. 16 September 2005
	261000.K1.01	
	Question 47	Rejected K/A as too simplistic (GFE level knowledge). Unable to develop a discriminatory examination question. Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 262001.A2 series. Selected 262001A2.03. 19 September 2005
	262001.A2.08	
RO Tier 2 / Group 2	Question 59	Changed "K3. Knowledge of the effect that a loss or malfunction of the CONTROL ROD DRIVE HYDRAULIC SYSTEM will have on following: K3.01 Recirculation pumps: Plant-Specific" to "K3. Knowledge of the effect that a loss or malfunction of the RECIRCULATION FLOW CONTROL SYSTEM will have on following: K3.01 Core flow". This corrects a typographical error in the original outline that was incorrectly copied from the original random sample generator to the examination outline. 21 September 2005
	202002.K3.01	
	Question 64	This K/A was rejected from the August 2004 ILO exam with the following statement: "This K/A is not directly applicable to Susquehanna and parallels system 241000 K/As. Susquehanna has no direct reheater controls, and reactor pressure is controlled <b>by EHC</b> (system 241 000)." Therefore, this K/A is rejected from this ILO exam as well. Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 239001.A1 series. Selected 239001.A1.06. 22 September 2005
	239001.A1.01	
	Question 64	Rejected 239001.A1.06 because Susquehanna Steam Electric Station (SSES) does NOT have air ejector radiation monitors. Air Ejector effluent is directed to the Offgas processing system. Offgas effluent is monitored for radiation. However, this is too far removed from the Air Ejector system to justify a K/A

	239001.A1.06	<p>match.</p> <p>Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 239001.A1 series. Selected 239001.A1.10.</p> <p>22 September 2005</p>
Question 34		Rejected 211000.2.1.2 during Chief Examiner review because unable to develop question with LOD greater than 1.0.
RO Tier 2 / Group 1		Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 211000.2.1 series. Selected 211000.2.1.33.
211000.2.1.2		30 September 2005
Question 47		Rejected 262001.A2.03 during Branch Chief review because unable to develop RO level question that meets this K/A. The requirement to "... use procedures to correct, control, or mitigate ..." is an SRO level task.
RO Tier 2 / Group 1		Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 262001.A2 series. Selected 262001.A2.05.
262001.A2.03		3 October 2005
Question 88		Rejected 262002.A2.02 because Uninterruptible Power Supplies were sampled and tested at the RO level (Question 48).
SRO Tier 2 / Group 1		Substituted the question originally developed for 262001.A2.03 in place for 262002.A2.02. This substitutes one A2 K/A for another A2 K/A; thereby preserving the breadth and diversity of the original sample plan.
262002.A2.02		5 October 2005.
Question 92		Rejected 216000.2.4.27 because I was unable to develop a plausible and discriminatory question after over eight hours of effort.
SRO Tier 2 / Group 1		Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 216000.2. series (two random draws: first for the 4, second for the 22). Selected 216000.2.2.22.
216000.2.4.27		12 October 2005
Question 13		Rejected 295025.EA2.02 because during review it was determined to be similar to 295006.AA2.04 and because development of a suitable question proved difficult.
RO Tier 1 / Group 1		Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the 295025.EA2 series. Selected 295025.EA2.03
295025.EA2.02		17 October 2005
Question 14		Rejected 295026.EK1.01 because during review it was determined high Suppression Pool water temperature and Pump NPSH was not a limiting concern at SSES. Therefore, SSES advised that recommendations on this K/A would have little relevance.
RO Tier 1 / Group 1		Selected 295026.EK1.02 directly because there are only two K/As under the

295026.EK1.01	295026.EK1 series. 17 October 2005
Question 21	Rejected because this was incorrectly copied from original sample. See, 295008.2.1.17 above. This should have been 295008.2.1.20. 17 October 2005
RO Tier 1 / Group 1	
295008.2.2.20	
Question 51	Unable to adequately test both ability to predict and use procedures of this two part K/A. Per authority of NUREG 1021, ES401, Section D.2.a., second paragraph [ <i>When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A.</i> ], the test question tests the ability to predict the impact of an air dryer malfunction. 18 October 2005.
RO Tier 2 / Group 1	
300000.A2.01	
Question 53	Unable to adequately test both ability to predict and use procedures of this two part K/A. Per authority of NUREG 1021, ES401, Section D.2.a., second paragraph [ <i>When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A.</i> ], the test question tests the ability to predict the impact of an air dryer malfunction. 18 October 2005.
RO Tier 2 / Group 1	
400000.A2.02	
Question 57	This K/A requires a nexus between the RWM and refueling administrative requirements. The ROD TEST function is the only nexus I can find. Specifically, the RWM Bypass Keylock switch is ADMINISTRATIVELY prohibited under the conditions of the question. Therefore, this question is submitted as an adequate K/A match pursuant to the authority of of NUREG 1021, ES401, Section D.2.a., second paragraph [ <i>When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A.</i> ]. 18 October 2005
RO Tier 2 / Group 2	
201006.2.2.26	

Question 63	<p>Unable to adequately test both ability to predict and use procedures of this two part K/A. Per authority of NUREG 1021, ES401, Section D.2.a., second paragraph [<i>When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A.</i>], the test question tests the ability to predict the impact of an air dryer malfunction.</p> <p>18 October 2005.</p>
RO Tier 2 / Group 2	
226001.A2.03	
Question 100	<p>Rejected Gen.2.4.10 because I was unable to develop an SRO level question with Level of Difficulty greater than 1 and less than 5 based on knowledge of annunciator response procedures.</p> <p>Used <a href="http://www.random.org">http://www.random.org</a> to select another K/A from the Gen2.4.10 series.</p> <p>Selected Gen.2.4.11.</p> <p>31 October 2005</p>
SRO Tier 3	
Generic 2.4.10	

Facility: SSESDate of Examination: 12/12/05 (Rev. 2)

Examination Level

RO ☒Operating Test Number: 1

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, P, R	2.1.18      2.9  78.AD.001.101  Document a failed LPRM and determine the appropriate compensatory actions.
Conduct of Operations	M, S	2.1.25      2.8  45.ON.007.001  Determine the Cause for reactor Water level anomaly.
Equipment Control	D, R	2.2.24      2.6  00.AD.269.101  Determine the Inputs to Zone 3 Iso Signal Lockout relay prior to maintenance.
Radiation Control		N/A
Emergency Plan	M, S	2.4.43      2.8  00.EP.004.002  Perform Control room communicator Emergency Notification.

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 &amp; Criteria

(C)ontrol Room, (S)imulator, or Class(R)oom

(D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)(N)ew or (M)odified from bank ( $\geq 1$ )(P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: SSESDate of Examination: 12/12/05 (Rev. 2)

Examination Level

SRO ☒Operating Test Number: 1

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	2.1.12      4.0  00.AD.273.001  Determine TRO applicability and complete the LCO/TRO log sheet.
Conduct of Operations	M, S	2.1.25      3.1  45.ON.007.001  Determine the Cause for reactor Water level anomaly, and determine Tech Spec required actions.
Equipment Control	M, R	2.2.24      3.8  00.AD.269.102  Determine the Inputs to Zone 3 Iso Signal Lockout relay prior to maintenance, and determine appropriate Tech Spec actions.
Radiation Control	D, R	2.3.6      3.1  69.OP.044.051  Review and Approve LW Discharge
Emergency Plan	N, S	2.4.41      4.0  00.EP.001.304, 305, 504, 505, 602  Perform Emergency Plan Classification and Complete the ENR 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 &amp; Criteria

(C)ontrol Room, (S)imulator, or Class(R)oom

(D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)(N)ew or (M)odified from bank ( $\geq 1$ )(P)revious 2 exams ( $\leq 1$ ; randomly selected)

Facility: <b>SSES</b>	Date of Examination: <b>12/12/05 (Rev. 2)</b>	
Exam Level:	<b>RO <input checked="" type="checkbox"/></b>	Operating Test No.: <u>    /    </u>
Control Room Systems <sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. 223001 A1.10 3.4/3.6 79.OP.006.102 Startup the "A" Containment Radiation Monitor System After Maintenance (post scram)	N, S, L	5
b. 295016 AA1.07 4.0/4.0 00.ON.015.104 Establish And Maintain Reactor Pressure With SRVs From The RSDP IAW ON-100-009	M, S, L	3
c. 262001 A4.04 3.6/3.7 98.GO.001.101 Synchronize Main Generator (17% power)	N, S	6
d. 206000 A4.14 4.2/4.1 52.OP.009.151 Terminate HPCI injection (with several malfunctions inserted)	D, A, S	4
e. 212000 K4.03 3.0/3.1 58.OP.008.101 Transferring Power Supply From RPS M-G Set To Alternate	D, S	7
f. 201003 A2.01 3.4/3.6 55.ON.007.152 Respond To A Stuck Control Rod IAW ON-155-001	N, A, S	1
g. 259001 A3.10 3.4/3.4 45.OP.004.151 Commence Feeding with an additional RFP/Shutdown RFP due to high vibrations.	N, A, S	2
h. 288000 A2.01 3.3/3.4 73.OP.001.101 Vent The Drywell IAW OP-173-003	N, S	9
In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 264000 A2.09 3.7/4.1 24.OP.001.007 Transfer of DG "E" for DG "C"	D,E	6
j. 295016 AA1.06 4.0/4.1 50.OP.004.152 Establish and Maintain Reactor Vessel Level (RCIC Not Injecting) from the RSDP Using the Trip and Throttle Valve	D,A,E, R,L	4
k. 201001 A2.07 3.2/3.1 55.OP.007.001 Shift The CRD Flow Stations From A To B In Accordance With OP-255-001	D, R	1
<p>@ 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.</p>		
*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	
(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: <u>SSES</u>		Date of Examination: <u>12/12/05 (Rev. 2)</u>
Exam Level:	<b>SROI</b> <input checked="" type="checkbox"/>	Operating Test No.: <u>1</u>
Control Room Systems <sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. 223001 A1.10 3.4/3.6 79.OP.006.102 Startup the "A" Containment Radiation Monitor System After Maintenance (post scram)	N, S, L	5
b.		
c. 262001 A4.04 3.6/3.7 98.GO.001.101 Synchronize Main Generator (17% power)	N, S	6
d. 206000 A4.14 4.2/4.1 52.OP.009.151 Terminate HPCI injection (with several malfunctions inserted)	D, A, S	4
e. 212000 K4.03 3.0/3.1 58.OP.008.101 Transferring Power Supply From RPS M-G Set To Alternate	D, S	7
f. 201003 A2.01 3.4/3.6 55.ON.007.152 Respond To A Stuck Control Rod IAW ON-155-001	N, A, S	1
g. 259001 A3.10 3.4/3.4 45.OP.004.151 Commence Feeding with an additional RFP/Shutdown RFP due to high vibrations.	N, A, S	2
h. 288000 A2.01 3.3/3.4 73.OP.001.101 Vent The Drywell IAW OP-173-003	N, S	9
In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. 264000 A2.09 3.7/4.1 24.OP.001.007 Transfer of DG "E" for DG "C"	D, E	6
j. 295016 AA1.06 4.0/4.1 50.OP.004.152 Establish and Maintain Reactor Vessel Level (RCIC Not Injecting) from the RSDP Using the Trip and Throttle Valve	D, A E, R, L	4
k. 201001 A2.07 3.2/3.1 55.OP.007.001 Shift The CRD Flow Stations From A To B In Accordance With OP-255-001	D, R	1
@ 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	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(L)ow-power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		



Facility: SSES Scenario No.: ILO-602 (Rev. 2) Op-Test No.: 1

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

**Initial Conditions:**

The scenario begins with both Units at 100% power. HPCI is OOS.

**Turnover:**

Swap in-service CRD pumps to allow maintenance to take vibration data on the CRD pump, maintenance crew is standing by.

Event No.	Malf. No.	Event Type*	Event Description
1		N	Swap in service CRD pumps
2		I/R	LEFM failure/forced power reduction <b>(TS)</b>
3		N/A	"C" MSL Flow Transmitter failure to 1.5 MPPH
4		I	Recirc flow Unit D fails downscale
5		C	Loss of CRD/inoperable accumulator <b>(TS)</b>
6		C/M	Failure to Scram/ARI Failure/ Electrical ATWS
7		C	SLC System failure
8		C	Main Turbine trip without bypass valve operation/loss of Aux busses 11A/11B
9		N/A	RCIC speed controller failure
10		M	Rapid Depressurization

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

Facility: SSES Scenario No.: ILO-505 (Rev. 2) Op-Test No.: 1  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Initial Conditions:**

The scenario begins with both Units at 100% power. All systems are operable.

**Turnover:**

Maintain current plant status. Perform scheduled surveillance.

Event No.	Malf. No.	Event Type*	Event Description
1		N	Perform SO-184-001 Quarterly MSIV Closure RPS Instrumentation
2		C	C72A-K3F Relay Failure during SO-184-001; Surveillance Fails (TS)
3		C/R	Inadvertent HPCI Initiation with HPCI low Flow alarm failed OFF. (Unexplained reactivity addition) (TS)
4		M	Recirc Loop B suction line break
5		I	ADS Auto Logic failure (Preload)
6		C	RHR injection valve 15B Auto logic failure
7		M	RPV Rapid Depressurization (lead in to RPV Flooding)
8		M	RPV Flooding (RPV level indication indeterminate due to violation of the SAT curve).

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

Facility: SSES Scenario No.: ILO-305 (Rev. 2) Op-Test No.: 1

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

**Initial Conditions:**

The scenario begins with Unit at 5% power with a startup in progress. Unit 2 at 100% power.

**Turnover:**

GO-100-002 has been completed through step 5.51.5. Continue plant startup at step 5.51.6 of GO-100-002.

Event No.	Malfunction No.	Event Type*	Event Description
1		N/R	Increase Power with control Rod withdrawal
2		C	Blown Fuse on common power Supply to IRMs B&F, and SRM B (RPS Div 2 half Scram)
3		C	"D" EDG Inadvertent Start (TS)
4		C	ESW pump trip (TS)
5		C/M	RWCU pump Room leak
6		C	RWCU Isolation valves Fail to isolate (Maintains leak to Sec Cont.)
7		C	7 Stuck Rods
8		C	Failed Fuel
9		M	Rapid Depressurization (2 Reactor Building Areas reaching radiation levels greater than Max Safe values)

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