

Facility: Cooper Nuclear Station														Date of Exam: July 28, 2014			
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	3	5	4	N/A			3	2	N/A			3	20	3	4	7
	2	1	2	1				1	1				1	7	2	1	3
	Tier Totals		4	7				5	4				3	4	27	5	5
	2. Plant Systems	1	3	2	2	2	2	3	3	2	2	2	3	26	2	3	5
2		1	2	1	1	1	1	1	1	1	1	1	12	0	2	3	
Tier Totals		4	4	3	3	3	4	4	3	3	3	4	38	4	4	8	
3. Generic Knowledge and Abilities Categories		1		2		3		4		10		1	2	3	4	7	
		2		3		3		2				2	2	2	1		

Note:

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

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	Q#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4		X					Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following: (CFR: 41.7 / 45.8) AK2.06 Reactor power	3.8	1
295003 Partial or Complete Loss of AC / 6			X				Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : (CFR: 41.5 / 45.6) AK3.03 Load shedding	3.5	2
295004 Partial or Total Loss of DC Pwr / 6					X		Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : (CFR: 41.10 / 43.5 / 45.13) AA2.02 Extent of partial or complete loss of D.C. power	3.5	3
295005 Main Turbine Generator Trip / 3				X			AA1. Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP : (CFR: 41.7 / 45.6) AA1.03 Reactor manual control/Red control and information system AA1.01 Recirculation system: Plant Specific	2.7 3.1	4
295006 SCRAM / 1	X						Knowledge of the operational implications of the following concepts as they apply to SCRAM : (CFR: 41.8 to 41.10) AK1.01 Decay heat generation and removal	3.7	5
295016 Control Room Abandonment / 7						X	AK1. Knowledge of the operational implications of the following concepts as they apply to CONTROL ROOM ABANDONMENT : (CFR: 41.8 to 41.10) 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. (CFR: 41.5 / 43.5 / 45.12)	4.2	6
295018 Partial or Total Loss of CCW / 8			X				AK3. Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : (CFR: 41.5 / 45.6) AK3.05 Placing standby heat exchanger in service AK3.02 Reactor power reduction	3.2 3.3	7

295019 Partial or Total Loss of Inst. Air / 8			X			AA1. Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : (CFR: 41.7 / 45.6) AA1.04 Service air isolations valves: Plant-Specific	3.3	8
295021 Loss of Shutdown Cooling / 4		X				AK2. Knowledge of the interrelations between LOSS OF SHUTDOWN COOLING and the following: (CFR: 41.7 / 45.8) AK2.02 Reactor water cleanup	3.6	9
295023 Refueling Acc / 8			X			AA1. Ability to operate and/or monitor the following as they apply to REFUELING ACCIDENTS : (CFR: 41.7 / 45.6) AA1.06 Neutron monitoring	3.3	10
295024 High Drywell Pressure / 5					X	High Drywell Pressure 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10) 2.4.31 Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)	3.5 4.2	11
295025 High Reactor Pressure / 3		X				EK2. Knowledge of the interrelations between HIGH REACTOR PRESSURE and the following: (CFR: 41.7 / 45.8) EK2.09 Reactor power	3.9	12
295026 Suppression Pool High Water Temp. / 5				X		EA2. Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: (CFR: 41.10 / 43.5 / 45.13) EA2.02 Suppression pool level	3.8	13
295027 High Containment Temperature / 5						NA for Cooper (Mark III Only)		
295028 High Drywell Temperature / 5			X			EK3. Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE : (CFR: 41.5 / 45.6) EK3.01 Emergency depressurization	3.6	14
295030 Low Suppression Pool Wtr Lvl / 5		X				EK2. Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: (CFR: 41.7 / 45.8) EK2.09 SPDS/ERIS/CRIDS/GDS: Plant-Specific	2.5	15
295031 Reactor Low Water Level / 2	X					EK1. Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL : (CFR: 41.8 to 41.10) EK1.03 Water level effects on reactor power	3.7	16

295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X						EK2. Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following: (CFR: 41.7 / 45.8) EK2.12 Rod control and information system: Plant-Specific	3.6	17
295038 High Off-site Release Rate / 9							X	295038 High Off-Site Release Rate 2.1.30 Ability to locate and operate components, including local controls. (CFR: 41.7 / 45.7)	4.4	18
600000 Plant Fire On Site / 8			X					AK3 Knowledge of the reasons for the following responses as they apply to PLANT FIRE ON SITE: AK3.04 Actions contained in the abnormal procedure for plant fire on site	2.8	19
700000 Generator Voltage and Electric Grid Disturbances / 6	X							AK1. Knowledge of the operational implications of the following concepts as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8) AK1.02 Over-excitation	3.3	20
K/A Category Totals:	3	5	4	3	2	3		Group Point Total:		20

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (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	Q#
295002 Loss of Main Condenser Vac / 3									
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2		X					AK2. Knowledge of the interrelations between HIGH REACTOR WATER LEVEL and the following: (CFR: 41.7 / 45.8) AK2.06 RCIC: Plant-Specific	3.4	21
295009 Low Reactor Water Level / 2					X		AK2. Knowledge of the interrelations between LOW REACTOR WATER LEVEL and the following: (CFR: 41.7 / 45.8) AK2.01 Reactor water level indication	3.9	22
295010 High Drywell Pressure / 5									
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5				X			AA1. Ability to operate and/or monitor the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE : (CFR: 41.7 / 45.6) AA1.01 Suppression pool cooling	3.9	23
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9									
295020 Inadvertent Cont. Isolation / 5 & 7									
295022 Loss of CRD Pumps / 1	X						Knowledge of the operational implications of the following concepts as they apply to LOSS OF CRD PUMPS: (CFR: 41.8 to 41.10) AK1.02 Reactivity control	3.6	24
295029 High Suppression Pool Wtr Lvl / 5									
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9			X				EK3. Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS : (CFR: 41.5 / 45.6) EK3.01 Emergency depressurization	3.3	25
295034 Secondary Containment Ventilation High Radiation / 9									

295035 Secondary Containment High Differential Pressure / 5		X						EK2. Knowledge of the interrelations between SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE and the following: (CFR: 41.7 / 45.8) EK2.01 Secondary containment ventilation	3.6	26
295036 Secondary Containment High Sump/Area Water Level / 5							X	295036 Secondary Containment High Sump/Area Water Level 2.4.18 Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)	3.3	27
500000 High CTMT Hydrogen Conc. / 5										
K/A Category Point Totals:								Group Point Total:		7

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
203000 RHR/LPCI: Injection Mode			X									K3. Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) will have on following: (CFR: 41.7 / 45.4) K3.03 Automatic depressurization logic	4.2	28
205000 Shutdown Cooling					X							K5. Knowledge of the operational implications of the following concepts as they apply to SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) : (CFR: 41.5 / 45.3) K5.03 Heat removal mechanisms	2.8	29
206000 HPCI							X					A1. Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including: (CFR: 41.5 / 45.5) A1.08 System lineup: BWR-2,3,4	4.1	30
207000 Isolation (Emergency) Condenser												Not Applicable to Cooper		
209001 LPCS									X			A3. Ability to monitor automatic operations of the LOW PRESSURE CORE SPRAY SYSTEM including: (CFR: 41.7 / 45.7) A3.02 Pump start	3.8	31
209002 HPCS												Not Applicable to Cooper		
211000 SLC		X						X				K2. Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.02 Explosive valves A2. Ability to (a) predict the impacts of the following on the STANDBY LIQUID CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.05 Loss of SBLC tank heaters	3.1 3.1	32 33

218000 ADS									X		A3. Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: (CFR: 41.7 / 45.7) A3.07 Lights and alarms	3.7	41
223002 PCIS/Nuclear Steam Supply Shutoff						X					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 : (CFR: 41.7 / 45.7) K6.06 Various process instrumentation	2.8	42
239002 SRVs			X								K3. Knowledge of the effect that a loss or malfunction of the RELIEF/SAFETY VALVES will have on following: (CFR: 41.7 / 45.4) K3.03 Ability to rapidly depressurize the reactor	4.3	43
259002 Reactor Water Level Control					X						K5. Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER LEVEL CONTROL SYSTEM : (CFR: 41.5 / 45.3) K5.03 Water level measurement	3.1	44
261000 SGTS							X				A1. Ability to predict and/or monitor changes in parameters associated with operating the STANDBY GAS TREATMENT SYSTEM controls including: (CFR: 41.5 / 45.5) A1.02 Primary containment pressure	3.1	45
262001 AC Electrical Distribution	X									X	K1. Knowledge of the physical connections and/or cause effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.04 Uninterruptible power supply 226001 A.C. Electrical Distribution 2.1.27 Knowledge of system purpose and/or function. (CFR: 41.7)	3.1 3.9	46 47
262002 UPS (AC/DC)				X							K4. Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and/or interlocks which provide for the following: (CFR: 41.7) K4.01 Transfer from preferred power to alternate power supplies	3.1	48
263000 DC Electrical Distribution		X									K2. Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.01 Major D.C. loads	3.1	49

264000 EDGs						X					X	K6. Knowledge of the effect that a loss or malfunction of the following will have on the EMERGENCY GENERATORS (DIESEL/JET) : (CFR: 41.7 / 45.7) K6.02 Fuel oil pumps 264000 Emergency Generators (Diesel/Jet) 2.1.1 Knowledge of conduct of operations requirements. (CFR: 41.10 / 45.13)	3.6	50
300000 Instrument Air	X											K1 Knowledge of the connections and / or cause effect relationships between INSTRUMENT AIR SYSTEM and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.05 Main Steam Isolation Valve air	3.1	52
400000 Component Cooling Water						X						K6 Knowledge of the effect that a loss or malfunction of the following will have on the CCWS: (CFR: 41.7 / 45.7) K6.06 Heat exchangers and condensers	2.9	53
K/A Category Point Totals:												Group Point Total:		26

ES-401 401-1		BWR Examination Outline										Form ES-		
Plant Systems - Tier 2/Group 2 (RO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
201001 CRD Hydraulic	X											K1. Knowledge of the physical connections and/or causeeffect relationships between CONTROL ROD DRIVE HYDRAULIC SYSTEM and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.09 Plant air systems	3.1	54
201002 RMCS														
201003 Control Rod and Drive Mechanism							X					A1. Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: (CFR: 41.5 / 45.5) A1.03 CRD drive water flow	2.9	55
201004 RSCS														
201005 RCIS			X									K3. Knowledge of the effect that a loss or malfunction of the ROD SEQUENCE CONTROL SYSTEM (PLANT SPECIFIC) will have on following: (CFR: 41.7 / 45.4) K3.01 Reactor manual control: BWR-4,5	3.3	56
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control														
204000 RWCU											X	204000 Reactor Water Cleanup System 2.1.41 Knowledge of the refueling process. (CFR: 41.2 / 41.10 / 43.6 / 45.13)	2.8	57
214000 RPIS														
215001 Traversing In-core Probe														
215002 RBM														
216000 Nuclear Boiler Inst.								X				A2. Ability to (a) predict the impacts of the following on the NUCLEAR BOILER INSTRUMENTATION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.04 Detector diaphragm failure or leakage	2.9	58
219000 RHR/LPCI: Torus/Pool Cooling Mode														

290002 Reactor Vessel Internals			X										K3. Knowledge of the effect that a loss or malfunction of the REACTOR VESSEL INTERNALS will have on following: (CFR:41.7 / 45.4) K3.03 Reactor power	3.3	56
K/A Category Point Totals:	1	2	1	1	1	1	1	1	1	1	1	1	Group Point Total:		12

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)						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	Q#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4									
295003 Partial or Complete Loss of AC / 6					X		AA2. Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : (CFR: 41.10 / 43.5 / 45.13) AA2.03 Battery status: Plant-Specific AA2.04 System lineups.	3.2	76
295004 Partial or Total Loss of DC Pwr / 6						X	295004 Partial or Complete Loss of D.C. Power 2.2.19 Knowledge of maintenance work order requirements. (CFR: 41.10 / 43.5 / 45.13)	3.4	77
295005 Main Turbine Generator Trip / 3						X	295005 Main Turbine Generator Trip 2.1.42 Knowledge of new and spent fuel movement procedures. (CFR: 41.10 / 43.7 / 45.13) 2.4.20 Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)	4.3	78
295006 SCRAM / 1									
295016 Control Room Abandonment / 7									
295018 Partial or Total Loss of CCW / 8					X		AA2. Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: (CFR: 41.10 / 43.5 / 45.13) AA2.03 Cause for partial or complete loss	3.5	79
295019 Partial or Total Loss of Inst. Air / 8									
295021 Loss of Shutdown Cooling / 4					X		AA2. Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : (CFR: 41.10 / 43.5 / 45.13) AA2.01 Reactor water heatup/cool-down rate	3.6	79
295023 Refueling Acc / 8									
295024 High Drywell Pressure / 5									
295025 High Reactor Pressure / 3						X	295025 High Reactor Pressure 2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)	3.8	80
295026 Suppression Pool High Water Temp. / 5									

295027 High Containment Temperature / 5									
295028 High Drywell Temperature / 5									
295030 Low Suppression Pool Wtr Lvl / 5									
295031 Reactor Low Water Level / 2						X		295031 Reactor Low Water Level 2.1.39 Knowledge of conservative decision making practices. (CFR: 41.10 / 43.5 / 45.12)	4.3 81
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1									
295038 High Off-site Release Rate / 9						X		EA2. Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : (CFR: 41.10 / 43.5 / 45.13) EA2.03 †Radiation levels	4.3 82
600000 Plant Fire On Site / 8									
700000 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:								Group Point Total:	7

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)							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	Q#	
295002 Loss of Main Condenser Vac / 3										
295007 High Reactor Pressure / 3					X		AA2. Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE : (CFR: 41.10 / 43.5 / 45.13) AA2.01 Reactor pressure	4.1	83	
295008 High Reactor Water Level / 2										
295009 Low Reactor Water Level / 2										
295010 High Drywell Pressure / 5										
295011 High Containment Temp / 5										
295012 High Drywell Temperature / 5										
295013 High Suppression Pool Temp. / 5										
295014 Inadvertent Reactivity Addition / 1						X	295014 Inadvertent Reactivity Addition 2.4.23 Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations. (CFR: 41.10 / 43.5 / 45.13)	4.4	84	
295015 Incomplete SCRAM / 1										
295017 High Off-site Release Rate / 9										
295020 Inadvertent Cont. Isolation / 5 & 7										
295022 Loss of CRD Pumps / 1										
295029 High Suppression Pool Wtr Lvl / 5										
295032 High Secondary Containment Area Temperature / 5										
295033 High Secondary Containment Area Radiation Levels / 9										
295034 Secondary Containment Ventilation High Radiation / 9										
295035 Secondary Containment High Differential Pressure / 5					X		EA2. Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: (CFR: 41.8 to 41.10) EA2.01 Secondary containment pressure: Plant-Specific	3.8	85	
295036 Secondary Containment High Sump/Area Water Level / 5										
500000 High CTMT Hydrogen Conc. / 5										

K/A Category Point Totals:								Group Point Total:		3

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
203000 RHR/LPCI: Injection Mode														
205000 Shutdown Cooling											X	205000 Shutdown Cooling System (RHR Shutdown Cooling Mode) 2.1.36 Knowledge of procedures and limitations involved in core alterations. (CFR: 41.10 / 43.6 / 45.7)	4.1	86
206000 HPCI														
207000 Isolation (Emergency) Condenser														
209001 LPCS														
209002 HPCS														
211000 SLC								X				A2. Ability to (a) predict the impacts of the following on the STANDBY LIQUID CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.06 Valve openings	3.3	87
212000 RPS														
215003 IRM														
215004 Source Range Monitor														
215005 APRM / LPRM											X	215005 Average Power Range Monitor/Local Power Range Monitor System 2.2.22 Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)	4.7	88
217000 RCIC														
218000 ADS														
223002 PCIS/Nuclear Steam Supply Shutoff														
239002 SRVs														
259002 Reactor Water Level Control														
261000 SGTS														

262001 AC 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: (CFR: 41.5 / 45.6) A2.07 Energizing a dead bus	3.2	89
262002 UPS (AC/DC)																
263000 DC Electrical Distribution																
264000 EDGs												X		264000 Emergency Generators (Diesel/Jet) 2.4.28 Knowledge of procedures relating to a security event (non-safeguards information). (CFR: 41.10 / 43.5 / 45.13)	4.1	90
300000 Instrument Air																
400000 Component Cooling Water																
K/A Category Point Totals:														Group Point Total:		5

ES-401 401-1		BWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)											Form ES-	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
201001 CRD Hydraulic														
201002 RMCS														
201003 Control Rod and Drive Mechanism								X				A2. Ability to (a) predict the impacts of the following on the CONTROL ROD AND DRIVE MECHANISM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.10 †Excessive SCRAM time for a given drive mechanism	3.4	91
201004 RSCS														
201005 RCIS														
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control														
204000 RWCU														
214000 RPIS														
215001 Traversing In-core Probe														
215002 RBM														
216000 Nuclear Boiler Inst.														
219000 RHR/LPCI: Torus/Pool Cooling Mode														
223001 Primary CTMT and Aux.														
226001 RHR/LPCI: CTMT Spray Mode														
230000 RHR/LPCI: Torus/Pool Spray Mode								X				A2. Ability to (a) predict the impacts of the following on the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6) A2.07 Emergency generator failure	3.8	92
233000 Fuel Pool Cooling/Cleanup														
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam														
239003 MSIV Leakage Control														
241000 Reactor/Turbine Pressure Regulator														

245000 Main Turbine Gen. / Aux.																					
256000 Reactor Condensate																					
259001 Reactor Feedwater																					
268000 Radwaste													X						268000 Radwaste	4.6	93
																			2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications.		
																			(CFR: 41.7 / 41.10 / 43.2 / 43.3 / 45.3)		
271000 Offgas																					
272000 Radiation Monitoring																					
286000 Fire Protection																					
288000 Plant Ventilation																					
290001 Secondary CTMT																					
290003 Control Room HVAC																					
290002 Reactor Vessel Internals																					
K/A Category Point Totals:																			Group Point Total:		3

Facility: Cooper Nuclear Station		Cooper Nuclear Station		Date of Exam: July 28, 2014			
Category	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
1. Conduct of Operations	2.1.18	2.1.18 Ability to make accurate, clear, and concise logs, records, status boards, and reports. (CFR: 41.10 / 45.12 / 45.13)	3.6	66			
	2.1.31	2.1.31 Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (CFR: 41.10 / 45.12)	4.6	67			
	2.1.7	2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (CFR: 41.5 / 43.5 / 45.12 / 45.13)			4.7	94	
	2.1.35	2.1.35 Knowledge of the fuel-handling responsibilities of SROs. (CFR: 41.10 / 43.7)			3.9	95	
	2.1.						
	2.1.						
	Subtotal		2		2		
2. Equipment Control	2.2.2	2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 41.6 / 41.7 / 45.2)	4.6	68			
	2.2.12	2.2.12 Knowledge of surveillance procedures. (CFR: 41.10 / 45.13)	3.7	69			
	2.2.41	2.2.41 Ability to obtain and interpret station electrical and mechanical drawings. (CFR: 41.10 / 45.12 / 45.13)	3.5	70			
	2.2.5	2.2.5 Knowledge of the process for making design or operating changes to the facility. (CFR: 41.10 / 43.3 / 45.13)			3.2	96	
	2.2.17	2.2.17 Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator. (CFR: 41.10 / 43.5 / 45.13)			3.8	97	
	2.2.						
	Subtotal		3		2		
3.	2.3.4	2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)	3.2	71			

Radiation Control	2.3.13	2.3.13 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. (CFR: 41.12 / 43.4 / 45.9 / 45.10)	3.4	72		
	2.3.7	2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10)	3.5	73		
	2.3.6	2.3.6 Ability to approve release permits. (CFR: 41.13 / 43.4 / 45.10)			3.8	98
	2.3.12	2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10)			3.7	99
	2.3.					
	Subtotal		3		2	
4. Emergency Procedures / Plan	2.4.18	2.4.18 Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)	3.3	74		
	2.4.26	2.4.26 Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage. (CFR: 41.10 / 43.5 / 45.12)	3.1	75		
	2.4.47	2.4.47 Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10 / 43.5 / 45.12)			4.2	100
	2.4.					
	2.4.					
	2.4.					
	Subtotal		2		1	
Tier 3 Point Total			10	10	7	7

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	2.3.7	Question 11. Could not write a psychometrically correct question dealing with High Drywell Pressure and the ability to comply with radiation work permit requirements during normal or abnormal conditions. Randomly selected another Generic K/A.
SRO 1/1	2.1.42	Question 78. Could not write a psychometrically correct question dealing with a Main Turbine Generator Trip and how that relates to the knowledge of new and spent fuel movement procedures. Randomly selected another Generic K/A.
SRO 1/1	295021.AA2.01	Question 79. This question was too similar to RO Question 9 and needed to be replaced. Could not write a psychometrically correct question dealing with a Loss of Shutdown Cooling that would be different than Question 9. Reselected from the non-used Abnormal Plant Evolution K/As and randomly selected 295018 Partial or Total Loss of CCW. Then randomly selected one of the three A2 K/A because the last two importance values were too low.
Tier 2/Group 1 (RO)	217000.A2.17	Question 40. The high suppression pool suction swap has been removed and there is no other operationally significant impacts associated with high suppression pool level. Using a random number generator 217000.A2.16 was selected from the remaining A2 topics to replace 217000.A2.17. GPJ
Tier 2/Group 1 (RO)	218000.A3.03	Question 41. Acoustic tail pipe monitors are not installed at Cooper Nuclear Station. Using a random number generator, 218000.A3.07 was selected from the remaining topics to replace 218000.A3.03. GPJ
Tier 2/Group 1 (RO)	259002.K5.01	Question 44. Cooper Nuclear Station no longer uses GEMAC/Foxboro/Bailey controller for reactor water level control. Using a random number generator, 259002.K5.03 was selected from the remaining topics to replace 250002.K5.01. GPJ
Tier 2/Group 2 (RO)	216000.A2.13	Question 58. Unable to develop an operationally and psychometrically valid question to this KA. Using a random number generator 216000.A2.04 was selected to replace 216000.A2.13. GPJ
Tier 2/Group1 (RO)	212000.K4.04	Question 35. Cooper Nuclear Station does not have an interlock that prevents supplying both RPS buses simultaneously from their alternate power source. Using a random number generator 212000.K4.12 was selected to replace 212000.K4.04
Tier 2/Group 2 (RO)	201004.K3.01	Question 56. The original randomly selected KA is on the line for RCIS (201005) which is a BWR6 system and is non-applicable to Cooper Nuclear Station (BWR4); Additionally if the intent is to sample 201004 (RSCS) this system is no longer used at Cooper Nuclear Station. Using a random number generator a new system was chosen from Tier 2/Group 2 that was not previously sampled. 290002 Reactor Vessel Internals was selected. Since a K3 topic was being replaced from the K3 topics a random selection yielded K3.03 as the replacement. 290002.K3.03 replaces 201004.K3.01.
Tier 1/Group 1 (RO)	295005 AA1.03	Question 4. The number of steps the candidate must mentally asses to connect the main turbine trip and reactor manual control system/control rod information system is excessive and difficult to write a psychometrically valid question. Using a random number generator 295005 AA1.01 was selected to replace 295005 AA1.03.
Tier 1/Group 1 (RO)	295018 AK3.05	Question 7. Cannot write a psychometrically valid question for this KA. Using a random number generator 295018 AK3.02 was selected to replace 295018 AK3.02.

Tier 2/group 2 (RO)	241000.K6.18	Question 61. Unable to develop an operationally and psychometrically valid test item for this KA. Using a random number generator 241000.K6.05 was selected to replace 241000.K6.18.
Tier 2/Group 2	215005.G2.2.1	Question 39. No applicability of generic KA 2.2.1 as it relates to 215005 could be found as the bases for a question. Using a random number generator 2.2.44 was selected to replace 2.2.1.
Tier 1/Group 1	295003 AA2.03	Question 76. Unable to develop an operationally valid test item for this KA. Using a random number generator 295003 AA2.04 was selected to replace AA2.03

Facility: <u>Cooper Nuclear Station</u>		Date of Examination: <u>2014</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO		Operating Test Number: <u>1</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	C,S,R,N	Determine required Action for Plant Chemistry Out of Specification
Conduct of Operations	C,S,R,M	Interpret GARDEL Official Case
Equipment Control	C,S,R,N	Determine Clearance Release Requirements
Radiation Control		
Emergency Procedures/Plan	D	Suppression Pool Temp Calculation
<p>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.</p>		
<p>* Type Codes & Criteria:</p> <p>(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)</p>		

Facility: <u>Cooper Nuclear Station</u>		Date of Examination: <u>2014</u>
Examination Level: RO SRO <input checked="" type="checkbox"/> X		Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	C,S,R,N	Determine required Actions for Plant Chemistry Out of Specification
Conduct of Operations	C,S,R,N	Approve a Procedure Change Request
Equipment Control	C,S,R,N	Determine the requirements for a Temporary Plant Modification
Radiation Control	C,S,R,D	Perform Dose Assessment (#2)
Emergency Procedures/Plan	C,S,R,N	Respond to a Medical Emergency

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: <u>Cooper Nuclear Station</u>	Date of Examination: <u>2014</u>
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	Operating Test No.: <u>1</u>

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. Placing SDG In Service From Control Room	C, S, L, P	6
b. Shifting from Single Element to Auto (3 element)	A, C, S, N	4
c. Recover from Manual Scoop Tube Operations	C, S, N	1
d. Transfer RPSP1B from RPS MG Set B to CDP-1A	N, C, S,	2
e. RPV Depressurization with RWCU	C, S, E, N	8
f. Secure RCIC from an inadvertent initiation	A, C, S, E, N	3
g. Respond to a Stuck Open Relief Valve	A, C, S, N,	5
h. Perform RPV level control with Core Spray from CST	C, S, L, EN, N	7
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Shutdown from Outside Control Room CRO Actions (5.1ASD)	A, E, D	9
j. Place 24 VDC Batteries and Associated Chargers in service	D	2
k. Alternate Boron Injection with RCIC	R, A, E, N	6
<p>[@] 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.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: <u>Cooper Nuclear Station</u>		Date of Examination: <u>2014</u>
Exam Level: RO SRO-I <input checked="" type="checkbox"/> SRO-U		Operating Test No.: <u>1</u>
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. Placing SDG In Service From Control Room	C, S, L, P	6
b. Shifting from Single Element to Auto (3 element)	A, C, S, N	4
c. Transfer RPSP1B from RPS MG Set B to CDP-1A	N, C, S,	2
d. RPV Depressurization with RWCU	C, S, E, N	8
e. Secure RCIC from an inadvertent initiation	A, C, S, E, N	3
f. Respond to a Stuck Open Relief Valve	A, C, S, N,	5
g. Perform RPV level control with Core Spray from CST	C, S, L, EN, N	7
h.		
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Shutdown from Outside Control Room CRO Actions (5.1ASD)	A, E, D	9
j. Place 24 VDC Batteries and Associated Chargers in service	D	2
k. Alternate Boron Injection with RCIC	R, A, E, N	6
<p>[@] 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.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	<p>4-6 / 4-6 / 2-3</p> <p>$\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$</p>	

Facility: <u>Cooper Nuclear Station</u>		Date of Examination: <u>2014</u>
Exam Level: RO SRO-I SRO-U <u>X</u>		Operating Test No.: <u>1</u>
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. Transfer RPSP1B from RPS MG Set B to CDP-1A	N, C, S,	2
b. Shifting from Single Element to Auto (3 element)	A, C, S, N	4
c. Perform RPV level control with Core Spray from CST	C, S, L, EN, N	7
d.		
e.		
f.		
g.		
h.		
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Shutdown from Outside Control Room CRO Actions (5.1ASD)	A, E, D	9
j. Alternate Boron Injection with RCIC	R, A, E, N	6
k.		
<p>[@] 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.</p>		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	<p>4-6 / 4-6 / 2-3</p> <p>$\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$</p>	

Facility:		Cooper Nuclear Station		Date of Exam: 7/28/2014		Operating Test No.: 1											
A P P L I C A N T	E V E N T T Y P E	Scenarios															
		1			2			3			4			T O T A L	M I N I M U M (*)		
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
RO-1 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX		5										1	1	1	0	
	NOR		2				2,5						3	1	1	1	
	I/C		6,10, 12				3,11, 12						6	4	4	2	
	MAJ		9				9						2	2	2	1	
	TS		N/A	N/A			N/A	N/A			N/A	N/A		N/A	0	2	2
RO-2 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX					1							1	1	1	0	
	NOR			1		1							2	1	1	1	
	I/C			13			7,8, 10						4	4	4	2	
	MAJ			9			9						2	2	2	1	
	TS		N/A	N/A			N/A	N/A			N/A	N/A		N/A	0	2	2
RO-3 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX		5										1	1	1	0	
	NOR		2				2,5						3	1	1	1	
	I/C		6,10, 12				3,11, 12						6	4	4	2	
	MAJ		9				9						2	2	2	1	
	TS		N/A	N/A			N/A	N/A			N/A	N/A		N/A	0	2	2
RO-4 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX					1							1	1	1	0	
	NOR			1		1							2	1	1	1	
	I/C			13			7,8, 10						4	4	4	2	
	MAJ			9			9						2	2	2	1	
	TS		N/A	N/A			N/A	N/A			N/A	N/A		N/A	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.

Facility:		Cooper Nuclear Station		Date of Exam: 7/28/2014		Operating Test No.: 1											
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
RO-5 <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX					1								1	1	1	0
	NOR			1										1	1	1	1
	I/C			13		7,8, 10								4	4	4	2
	MAJ			9		9								2	2	2	1
	TS		N/A	N/A		N/A	N/A		N/A	N/A				N/A	0	2	2
RO <input type="checkbox"/> SRO-I-1 <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX		5		1									2	1	1	0
	NOR		2		2,5									3	1	1	1
	I/C		6,10, 12		3,7,8, 10,11 ,12									9	4	4	2
	MAJ		9		9									2	2	2	1
	TS		N/A	N/A	4,6	N/A	N/A		N/A	N/A				2	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U-1 <input checked="" type="checkbox"/>	RX	2,5												2	1	1	0
	NOR	1												1	1	1	1
	I/C	6,10, 12												3	4	4	2
	MAJ	9												1	2	2	1
	TS	3,7	N/A	N/A		N/A	N/A		N/A	N/A				2	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U-2 <input checked="" type="checkbox"/>	RX	2,5												2	1	1	0
	NOR	1												1	1	1	1
	I/C	6,10, 12												3	4	4	2
	MAJ	9												1	2	2	1
	TS	3,7	N/A	N/A		N/A	N/A		N/A	N/A				2	0	2	2

Instructions:

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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.

Facility:		Cooper Nuclear Station		Date of Exam: 7/28/2014		Operating Test No.: 1											
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		R	I	U
RO <input type="checkbox"/>	RX	2,5												2	1	1	0
SRO-I <input type="checkbox"/>	NOR	1												1	1	1	1
SRO-U-3 <input type="checkbox"/>	I/C	6,10, 12												3	4	4	2
X	MAJ	9												1	2	2	1
	TS	3,7												2	0	2	2
RO <input type="checkbox"/>	RX														1	1	0
SRO-I <input type="checkbox"/>	NOR														1	1	1
SRO-U <input type="checkbox"/>	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2
RO <input type="checkbox"/>	RX														1	1	0
SRO-I <input type="checkbox"/>	NOR														1	1	1
SRO-U <input type="checkbox"/>	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2
RO <input type="checkbox"/>	RX														1	1	0
SRO-I <input type="checkbox"/>	NOR														1	1	1
SRO-U <input type="checkbox"/>	I/C														4	4	2
	MAJ														2	2	1
	TS														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.

Facility: <u>CNS</u>	Scenario No.: <u>1</u>	Op-Test No.: <u>1</u>
Examiners: _____		Operators: _____
_____		_____
_____		_____
Initial Conditions: <u>60% power (BCL), D CWP out of service,</u>		

Turnover: <u>Return D CWP to service, 2.2.3 completed to step 5.5, backwash completed, continue</u>		
<u>startup to 100% power, 2.1.10, rod 10-19 next to be w/d (pg. 4 of 5 Step 5).</u>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Place Circulating Water Pump D in service (2.2.3)
2	N/A	R	Raise Reactor Power using control rods (2.1.10)
3	N/A	TS	Enters Tech Spec 3.1.7, Condition B (Based on SLC Tank Suction to pumps Closed)
4	EG03	C	H2 Gas leak in Generator (2.4 Gen)
5	N/A	N, R	Reduce power using Recirculation Pump Flow (2.1.10)
6	N/A	C	Manual Scram P.B. failure on scram
7	N/A	TS	Enters Tech Spec 3.3.1.1, Condition G for failed RPS Channel Inst.
8	FW20	C	High Pressure Feedwater Htr. Level Control Valve Failure (2.4 Ex-Stm)
9	CR04	M	Unit SCRAM due to THI (EOP 1A, 6A, 7A)
10	RD02	I	ATWS (EOP 5.8.3)
11	FW19b	C	FW Line B Break inside DW (transition to ECCS for RPV Level Control) 2.4MC-FW
12	O/R	C	NI Drive IN Switch fails to actuate
13	RC04	I/C	RCIC controller fails downscale in AUTO, works in Manual

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)echnical Specifications, (©) CT

Initial Conditions: 60% power (BCL), "B" CWP out of service,

Turnover:

The "D" CWP will be returned to service, 2.2.3 completed to step 5.5, backwash completed, continue startup to 100% power, 2.1.10, rod 10-19 next to be w/d (pg. 4 of 5 Step 5).

Description:

BOP Operator will place the 4th Circulating Water Pump in service

The ATC will raise reactor power using Reactor Recirculation flow and Rods at least 5% power.

A non-licensed operator will call the control room and report that the SLC Tank suction valve to the pumps is unlocked and closed. This will require the SRO to enter Tech Spec 3.1.7, Condition B (Based on SLC Tank Suction Closed) and determine it must be restored within 8 hours per action B.1.

The BOP operator will respond to a H2 Gas leak on the main generator. Abnormal procedure 2.4GEN will be entered requiring the operator to remove the generator from service due to excessive leakage.

The ATC will reduce Reactor Recirculation flow to lower power in preparation for removing the reactor from service using procedure 2.1.10, Station Power Changes.

During power reduction a high pressure Feedwater heater level control valve will fail requiring entry into 2.4EX-STM.

This combined with the power reduction will require the SRO to SCRAM the reactor or enter the Thermal Instability Region of the power to flow map which will result in power flux peaking.

The SRO will direct the ATC to SCRAM the reactor while entering EOP 1A. One Manual Scram Pushbutton will fail to actuate.

The SRO will enter Tech Spec 3.3.1.1, Condition G for failed RPS Channel Inst., in table 3.3.1.1 #11, and determine Action G is required to be in Mode 3 in 12 hours.

When the reactor is SCRAMMED 15 control rods fail to fully insert (ATWS). The SRO will enter EOPs 6A and 7A. The ATC will drive control rods per 2.4CRD Attachment 2.

During execution of the SCRAM actions the ATC will recognize that the Nuclear Instrumentation "Drive IN" switch does not actuate which results in SRM and IRMs remaining withdrawn. The SRO will determine the reactor is shutdown when all rods are fully inserted.

A small Feedwater line break will occur inside the drywell requiring the BOP operator to utilize ECCS systems to maintain reactor water level.

When RCIC is started the BOP Operator will recognize the Controller is not working In AUTO and transfer the controller to MANUAL to control Reactor Water Level.

The scenario ends when Reactor Water Level is restored to the normal band and all control rods are inserted.

Facility: <u> CNS </u>	Scenario No.: <u> 2 </u>	Op-Test No.: <u> 1 </u>
Examiners: _____		Operators: _____
_____		_____
_____		_____
Initial Conditions: <u>100% power, EOL, no equipment out of service.</u>		
Turnover: Reduce power to 90% for HPCI Test. Following HPCI Test return to 100% power. 6.HPCI.103 completed to Step 4.13		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N, R	Reduce Power with Reactor Recirculation (2.1.10)
2.	N/A	N	Place RHR B in Suppression Pool Cooling (2.2.69.3)
3	O/R	C	RHRSW Heat Exchanger Outlet Valve fails to open fully (2.2.70)
4	N/A	TS	The SRO addresses Tech Spec 3.6.2 Action A for Containment Sprays and determines one loop is INOP
5	N/A	N	Perform HPCI Full Flow Test (6.HPCI.103)
6	N/A	TS	Enters Tech Spec 3.5.1C and declares HPCI INOP
7	RR50A	C	Reactor Recirculation Pump high Vibration (ARP)
8	RR10A, RR11A,	C	Recirculation Pump Seal Failure (ARP)
9	RR31A	M	LOCA – RR Suction Line Break (EOP 1A)
10	RD01	C	Scram Discharge Volume Drain Vlv. Fails to close.
11	RH01	C	RHR Pump A Trips during DW Spray, Requires Starting 2 nd Pump
12	O/R	I	RHR Drywell Spray Valve fails to auto close on low DW pressure.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)echnical Specifications, (©) CT

Initial Conditions: 100% power, EOL, no systems out of service.

Turnover:

Reduce power to 90% for HPCI Test, following HPCI Test return to 100% power. 6.HPCI.103 completed to step 4.13

Description:

The ATC reduces reactor power using reactor recirculation flow to 90% reactor power in preparation for the HPCI Full Flow Test per 2.1.10 Station Power Changes.

The BOP Operator places "B" Loop of RHR in service to support the HPCI Full Flow Test per 2.2.69.3, RHR Suppression Pool Cooling and Containment Spray and 2.2.70, RHR Service Water Booster Pump System.

The RHR Heat exchanger Outlet Valve fails to fully open and the "A" Loop of RHR is placed in service and is addressed by the BOP operator per 2.2.70. RHR Service Water Booster Pump System.

The SRO addresses Tech Spec 3.6.2 Action A for Containment Sprays and determines one loop is INOP.

The BOP Operator performs the HPCI Full Flow Test per 6.HPCI.103. at step 4.1.6 the test fails and the SRO addresses Tech Spec 3.5.1C and declares HPCI INOP.

The ATC responds to high vibration on the "A" Reactor Recirculation Pump per ARP 9-4-3/C-3 and begins to reduce recirc pump speed to reduce vibrations. The vibration continues and the Recirc Pump seals fail resulting in a LOCA inside the Drywell. The SRO enters EOP 1A and directs the ATC to SCRAM the reactor then enters EOP 2A to address containment pressure issues.

During the SCRAM recovery one of the SDV drain valves fails to close resulting in a primary system leaking into secondary containment. The ATC recognizes this and sends a non-licensed operator to override the valve closed.

During Drywell Sprays the "A" RHR Pump trips and the BOP operator starts another RHR pump to continue Drywell Sprays.

The SRO directs the BOP operator to secure Drywell Sprays at approximately 2 psig per EOP 2A, if the operator fails to control drywell pressure the valves will NOT close resulting in a negative pressure in primary containment.

The scenario ends when the primary containment pressure is being controlled in band (+2 – 10 psig) as directed by the SRO and Reactor water level is in the normal range.

Facility: <u>CNS</u>	Scenario No.: <u>3</u>	Op-Test No.: <u>1</u>	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: <u>4%, BCL, power, plant startup in progress.</u>			
<p>Turnover: <u>Procedure 2.1.1, Steps 4.22 and 5.36 are completed, 2.2.77 Attachment 1, Step 1.14 is complete, 2.2.28.1 Step 5.14 is complete, LCOs and Logs are complete for change to MODE 1. Fuel is being de-channeled on the refueling floor, No Tech Specs Limitations in effect. Reactor Coolant samples (1xE-3 Micro-Curies / CC) indicate higher than normal gross activity level for this point in a startup. Site Management and Reactor Engineering have indicated the startup can continue normally. PRA risk is green. Continue plant startup.</u></p>			
Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N, R	Continue startup using control rods
2	SW01d	C	Service Water Pump D Trip (ARP B-3/B-7)
3	N/A	TS	Tech Spec LCO 3.7.2 Service Water (SW) System and Ultimate Heat Sink (UHS) for number of Operable SW Pumps.
4	RD03d	C	Control Rod Drifts IN (2.4 CRD)
5	N/A	TS	Tech Spec LCO 3.1.5 for Inoperable Control Rod.
6	HP05,C R01, CR03	I	HPCI Inadvertent Initiation / Fuel Failure (2.4CSCS)
7	HP06, HP09, HP15	M	LOCA - Steam line break into Secondary Containment (EOP-5A, 2.4 OG, 5.1RAD)
8	N/A	R	SCRAM (2.1.5)
9	N/A	M	Emergency Depressurization (>2 above Max Safe) EOP-2A
10	FW28B	C	Reactor Feedpump fails to trip on high level
11	NM05A	C	IRM power supply failure (ARP 9-5-1/D-7)
12	PC18a / b	I	SGT Fans A & B fail to auto start
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)echnical Specifications, (©) CT</p>			

Initial Conditions: 4%, BCL, power, plant startup in progress.

Turnover:

Procedure 2.1.1, Steps 4.22 and 5.36 are completed, 2.2.77 Attachment 1, Step 1.14 is complete, 2.2.28.1 Step 5.14 is complete, LCOs and Logs are complete for change to MODE 1. Fuel is being de-channeled on the refueling floor, No Tech Specs Limitations in effect. Reactor Coolant samples (1xE-3 Micro-Curies / CC) indicate higher than normal gross activity level for this point in a startup. Site Management and Reactor Engineering have indicated the startup can continue normally. PRA risk is green. Continue plant startup.

Description:

The ATC continues the plant startup using control rods.

The BOP operator responds to a Service Water Pump Trip per ARP B-3/B-7.

The SRO address Tech Spec LCO 3.7.2 Service Water (SW) System and Ultimate Heat Sink (UHS) for number of Operable SW Pumps.

One Control Rod drifts in and the ATC responds per 2.4CRD to fully insert the Control Rod.

The SRO addresses Tech Spec LCO 3.1.5 for Inoperable Control Rod.

An Inadvertent HPCI Actuation and Injection occurs resulting in Fuel Failure. The BOP Operator responds per 2.4CSCS.

The HPCI Steam line breaks in Secondary Containment. The SRO enters EOP 5A.

As area temperatures and radiation continue to rise the SRO directs the ATC to SCRAM the reactor per 2.1.5, and follows up by entering 2.4 RAD and 2.4 OG.

During SCRAM Actions one IRM power supply fails requiring the ATC to bypass the IRM per ARP 9-5-1/D7.

Once two or more areas are above Max Safe the SRO will direct the BOP operator to Emergency Depressurize the Reactor per EOP 2A.

The SGT fans fail to auto start and the BOP operator must manually start them to prevent the secondary containment from becoming positive and potential radioactivity release.

During recovery of reactor water level using Feedwater the remaining Reactor Feedpump trips on high level requiring the BOP operator to control RPV level control using ECCS Systems.

The scenario ends when the RPV level has been restored to the normal range following emergency depressurization and the SGT system has restored negative pressure in the secondary containment.