

Facility: Columbia Generating Station (CGS)														Date of Exam: September 2004				
Tier	Group	RO K/A Category Points											Total	SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *		K	A	A 2	G *	Total
1. Emergency & Abnormal Plant Evolutions	1	3	4	3				3	4			3	20	2	1	3	2	8
	2	1	1	1				1	1			2	7	0	1	2	1	4
	Tier Totals	4	5	4				4	5			5	27	2	2	5	3	12
2. Plant Systems	1	3	2	2	2	3	3	2	2	2	3	2	26	0	1	1	2	4
	2	1	2	1	1	1	1	1	1	1	1	1	12	1	0	1	0	2
	Tier Totals	4	4	3	3	4	4	3	3	3	4	3	38	1	1	2	2	6
3. Generic Knowledge and Abilities Categories					1	2	3	4	10					1	2	3	4	7
					3	2	2	3						2	2	1	2	

- 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 ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 100-75 points and the SRO-only exam must total 25 points.
 3. Select topics from many systems and evolutions; avoid selecting more than two or three 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 SRO-applicable license level, and the point totals for each system and category. ~~K/As below 2.5 should be justified on the basis of plant-specific priorities.~~ 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.
 - h. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
 - i. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

ES-401		CGS BWR—Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / 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	#	
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4			R				AK3.02 Reactor Power Response	3.7		
295003 Partial or Complete Loss of AC / 6		R		S			AK2.01 Station Batteries (R) AA1.02 Emergency Diesel Generators (S)	3.2(R) 4.2(S)		
295004 Partial or Total Loss of DC Pwr / 6	R				S		AK1.06 Prevention of inadvertent system(s) actuation upon restoration of DC power (R) AA2.02 Extent of Partial or Complete Loss of D.C. Power(S)	3.3(R) 3.5(S)		
295005 Main Turbine Generator Trip / 3		S		R			AA1.01 Recirculation System: Plant Specific (R) AK2.07 Reactor Pressure Control (S)	3.1(R) 3.7(S)		
295006 SCRAM / 1					R		AA2.02 Control Rod Position	4.3*		
295016 Control Room Abandonment / 7						R S	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (R) 2.4.29 Knowledge of the Emergency Plan (S)	4.0(R) 4.0(S)		
295018 Partial or Total Loss of CCW / 8						R	AA2.03 Cause for partial or complete loss	3.2		
295019 Partial or Total Loss of Inst. Air / 8		R					AK2.12 Standby Gas Treatment/FRVS	3.3		
295021 Loss of Shutdown Cooling / 4	R						AK1.01 Decay Heat	3.6		
295023 Refueling Acc Cooling Mode / 8				R			AA1.02 Fuel pool cooling and cleanup system	2.9		
295024 High Drywell Pressure / 5						R	2.1.32 Ability to apply system limits and precautions.	3.4		
295025 High Reactor Pressure / 3			R				AK3.08 Reactor/Turbine pressure regulating system	3.5		
295026 Suppression Pool High Water Temp. / 5				R			EA1.01 Suppression Pool Cooling	4.1		
295027 High Containment Temperature / 5	-	-	-	-	-	-	Deleted - Not applicable to CGS	-----		
295028 High Drywell Temperature / 5					S	R	2.3.11 Ability to control radiation releases. (R) EA2.03 Reactor Water Level (S)	2.7(R) 3.9(S)		
295030 Low Suppression Pool Wtr Lvl / 5	R	R					EK1.03 Heat Capacity EK2.02 RCIC: Plant Specific	3.8 3.7		
295031 Reactor Low Water Level / 2			R				EK3.03 Spray Cooling	4.1		
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1					R S		EA2.05 Control Rod Position (R) EK2.03 ARI/RPT/ATWS: Plant Specific (S)	4.2		
295038 High Off-site Release Rate / 9		R				S	EK2.09 Post Accident Sample System 2.3.9 Knowledge of the Process for Performing a Containment Purge(S)	2.9(R) 3.7(S)		
600000 Plant Fire On Site / 8			S		R		AA2.06 Need for pressurizing the control room (R) AK3.04 Actions Contained in the Abnormal Procedure for Plant Fire on Site (S)	2.5 3.4(S)		
(19 Total E/APs)										
(20 RO & 8 SRO Required)										
R=	3	4	3	3	4	3	=20			
S=	0	1	1	1	3	2	=8			
K/A Category Totals:							Group Point Total:		20/ 8	

ES-401		CGS BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / 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	#	
295002 Loss of Main Condenser Vac / 3										
295007 High Reactor Pressure / 3						R	2.4.1 Knowledge of EOP Entry Conditions and Immediate Action Steps	4.3		
295008 High Reactor Water Level / 2										
295009 Low Reactor Water Level / 2										
295010 High Drywell Pressure / 5										
295011 High Containment Temp / 5	-	-	-	-	-	-	Deleted - Not applicable to CGS			
295012 High Drywell Temperature / 5	R					S	AK1.01 Pressure/Temperature Relationship (R) AA2.03 Drywell Humidity (S)	3.3(R) 3.1(S)		
295013 High Suppression Pool Temp. / 5										
295014 Inadvertent Reactivity Addition / 1										
295015 Incomplete SCRAM / 1			R				AK3.01 Bypassing Rod Insertion Blocks	3.4		
295017 High Off-site Release Rate / 9						S				
295020 Inadvertent Cont. Isolation / 5 & 7										
295022 Loss of CRD Pumps / 1										
295029 High Suppression Pool Wtr Lvl / 5				R S			EA1.02 HPCS: Plant Specific (R) EA1.03 RHR/LPCI	3.1(R) 3.0(S)		
295032 High Secondary Containment Area Temperature / 5						R	EA2.01 Area Temperature	3.8		
295033 High Secondary Containment Area Radiation Levels / 9										
295034 Secondary Containment Ventilation High Radiation / 9		R					EK2.03 Standby Gas Treatment/FRVS: Plant Specific	4.3		
295035 Secondary Containment High Differential Pressure / 5										
295036 Secondary Containment High Sump/Area Water Level / 5						S	SRO			
500000 High CTMT Hydrogen Conc. / 5						R	2.4.20 Knowledge of Operational Implications of EOP Warnings/Cautions/and notes.	3.3		
(19 Total E/APs)										
(7 RO & 4 SRO Required)										
R=	1	1	1	1	1	2				
S=	0	0	0	1	0	1				
K/A Category Point Totals:							Group Point Total:		7 / 4	

ES-401		CGS BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / 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	#
203000 RHR/LPCI: Injection Mode								R				A2.06 Emergency Generator Failure	3.8	
205000 Shutdown Cooling					R				R			K5.03 Heat Removal Mechanisms A3.01 Valve Operation	2.8 3.2	
206000 HPCI	-	-	-	-	-	-	-	-	-	-	-	Deleted - Not applicable to CGS		
207000 Isolation (Emergency) Condenser	-	-	-	-	-	-	-	-	-	-	-	Deleted - Not applicable to CGS		
209001 LPCS							R				R	A1.07 Emergency Generator Loading 2.1.12 Ability to Apply Technical Specifications for a System	3.0 2.9	
209002 HPCS			R									K3.03 Adequate Core Cooling	3.9	
211000 SLC										R		A4.06 RWCU Isolation	3.9	
212000 RPS	R											K1.07 Relief/safety valves (low-low-set logic) Plant Specific:	3.3	
215003 IRM		R										K2.01 IRM Channels/Detectors	2.5	
215004 Source Range Monitor				R		R			S			K4.03 Rod Withdrawal Blocks (R) K6.05 Trip Units (R) A3.04 Control Rod Block Status (S)	3.7(R) 2.6(R) 3.6(S)	
215005 APRM / LPRM	R											K1.14 Reactor Vessel	2.8	
217000 RCIC			R		R							K3.04 Adequate Core Cooling K5.02 Flow Indications	3.6 3.1	
218000 ADS	R					R						K1.06 Safety/Relief Valves K6.07 Primary Containment Instrumentation	3.9 3.4	
223002 PCIS/Nuclear Steam Supply Shutoff			R									K3.21 Traversing in-core probe system	2.5	
239002 SRVs								R				A2.04 ADS Actuation	4.1*	
259002 Reactor Water Level Control								S	R			A3.05 Changes in Reactor Power (R) A2.07 Loss of Comparator Bias Signal (S)	2.8(R) 2.5(S)	
261000 SGTS				R							S	K4.05 Fission Product Gas Removal (R) 2.4.13 Knowledge of Crew Roles and Responsibilities During EOP Flowchart Use (S)	2.6(R) 3.9(S)	
262001 AC Electrical Distribution							R					A1.02 Breaker Lineups	3.2	
262002 UPS (AC/DC)										R		A4.01 Transfer From Alternative Source To Preferred Source	2.8	
263000 DC Electrical Distribution											S R	2.2.13 Knowledge of Tagging and Clearance Procedures (R) 2.1.32 Ability to Explain and Apply System Limits and Precautions (S)	3.6(R) 3.8(S)	
264000 EDGs				R								K4.02 Emergency Generator Trips (emergency/LOCA)	4.0	
300000 Instrument Air					R							K5.13 Filters	2.9	
400000 Component Cooling Water						R						K6.05 Pumps	3.0	
(21 Total Systems) R=	3	2	2	3	3	3	2	2	2	2	2	(26 RO & 4 SRO Required)		
K/A Category Point Totals: S=	0	0	0	0	0	0	0	1	1	0	2	Group Point Total:		26/ 4

ES-401		CGS BWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / 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	#
201001 CRD Hydraulic														
201002 RMCS								S				A2.02 Rod Drift Alarm	3.3	
201003 Control Rod and Drive Mechanism														
201004 RSCS				R								K4.05 Rod Movement, Direction, and Selection Information: BWR-4,5	3.2	
201005 RCIS														
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control														
204000 RWCU											R	2.1.29 Knowledge of How to Conduct and Verify Valve Lineups	3.4	
214000 RPIS								R				A2.01 Failed Reed Switches	3.1	
215001 Traversing In-core Probe														
215002 RBM														
216000 Nuclear Boiler Inst.														
219000 RHR/LPCI: Torus/Pool Cooling Mode		R										K2.02 Pumps	3.1*	
223001 Primary CTMT and Aux.														
226001 RHR/LPCI: CTMT Spray Mode			R									K3.02 Containment/Drywell/Suppression Chamber Components	3.5	
230000 RHR/LPCI: Torus/Pool Spray Mode														
233000 Fuel Pool Cooling/Cleanup														
234000 Fuel Handling Equipment						R						K6.07 Fuel Pool Ventilation	2.9	
239001 Main and Reheat Steam				S								K4.11 Positive Sealing of the MSIV's When Shutdown	3.1	
239003 MSIV Leakage Control														
241000 Reactor/Turbine Pressure Regulator			R									K3.01 Reactor Power	4.1	
245000 Main Turbine Gen. / Aux.										R		A4.08 Turbine Oil Pressure	2.7	
256000 Reactor Condensate					R							K5.01 System Venting	2.5	
259001 Reactor Feedwater									R			A3.04 Reactor Water Level	3.8	
268000 Radwaste	R											K1.06 Drywell Floor Drains	2.9	
271000 Offgas							R					A1.15 Steam Supply Pressures	2.7	
272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation														
290001 Secondary CTMT														
290003 Control Room HVAC														
290002 Reactor Vessel Internals												(33 Total Systems) (12 RO & 2 SRO Required)		
K/A Category Point Totals:	1	1	2	1	1	1	1	1	1	1	1	Group Point Total:		12/2

ES-401

Generic Knowledge and Abilities Outline (Tier 3)

Form ES-401-53

Facility: Columbia Generating Station

Date of Exam: September 2004

Exam Level:

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements.	3.7	65		
	2.1.20	Ability to execute procedure steps.	4.3	66		
	2.1.25	Ability to obtain and interpret station reference materials such as graphs/monographs/and tables which contain performance data.	2.8	55		
	2.1.7	Ability to evaluate plant performance and make operational judgements based on operating characteristics / reactor behavior / and instrument interpretation.			4.4	17
	2.1.10	Knowledge of conditions and limitations in the facility license.			3.9	18
	2.1.					
	Subtotal			3		2
2. Equipment Control	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	56		
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	3.4	57		
	2.2.11	Knowledge of the process of controlling temporary changes.			3.4*	10
	2.2.26	Knowledge of refueling administrative requirements.			3.7	11
	2.2.					
	2.2.					
	Subtotal			2		2
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control / including permissible levels in excess of those authorized.	2.5	70		
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	71		
	2.3.2	Knowledge of facility ALARA program.			2.9	15
	2.3.					
	2.3.					
	2.3.					
	Subtotal			2		1
4. Emergency Procedures / Plan	2.4.11	Knowledge of abnormal condition procedures.	3.4	68		
	2.4.17	Knowledge of EOP terms and definitions.	3.1	69		
	2.4.18	Knowledge of the specific bases for EOPs.	2.7	72		
	2.4.1	Knowledge of EOP entry conditions and immediate action steps.			4.6	19
	2.4.44	Knowledge of emergency plan protective action recommendations.			4.0	12
	2.4.					
	Subtotal			3		2
Tier 3 Point Total (RO/SRO)				1310		177

Facility: Columbia Generating Station Date of examination: September 2004	
Examination level: SRO Operating test number:	
Administrative (see Note below)	Describe the activity to be performed
A1. Conduct of Operations	<p>2.1.18 Ability to make accurate / clear and concise logs / records / status boards / and reports.</p> <p>Given information on an inoperable technical specification component, complete an INOP EQUIP/LCO/RFO STATUS SHEET. New</p>
A2. Conduct of Operations	<p>2.1.24 – Ability to obtain and interpret station electrical and mechanical drawings. 2.8/3.1</p> <p>Explain failure of ROA-FN-1A indications from a blown fuse in the trip circuit. CGS LER 88-07 1999 NRC Exam</p>
B. Equipment Control	<p>2.2.13 – Knowledge of tagging and clearance procedures.</p> <p>Given a tagging scenario with mistakes, find and correct errors. 1998 NRC Exam</p>
C. Radiation Control	<p>2.3.11 – Ability to control radiation release. 2.7/3.2</p> <p>Calculate projected dose using QEDPS and information given. 2002 NRC Exam</p>
D. Emergency Plan	<p>2.4.41 – Knowledge of Emergency action level thresholds and classifications. 2.3/4.1</p> <p>After participating in an event on the simulator, determine the E-Plan classification and PAR. New</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 5 are required.	

Facility: Columbia Generating Station		Date of examination: September 2004
Examination level: RO		Operating test number:
Administrative (see Note below)	Describe the activity to be performed	
A1. Conduct of Operations	2.1.7 – Ability to evaluate plant performance and make operational judgments based on operation characteristics/reactor behavior/and instrument interpretation. 3.7/4.4 Determine actions needed when criticality occurs outside of the ECP. 1999 NRC Exam	
A2. Conduct of Operations	2.1.12 – Ability to apply Tech Specs for a system. Given a section of OSP-INST-H101, Shift and Daily Inst. Checks (Modes 1, 2, and 3), determine SLC operability from the information provided. 1999 NRC Exam	
B. Equipment Control	2.2.13 – Knowledge of tagging and clearance procedure. Prepare a tagout for CRDH Pump A without the use of the tagout computer. New	
C. Radiation Control	2.3.1 – Knowledge of 10CFR20 and related facility radiation control requirements. Given a valve lineup to perform in the RCA, determine which RWP to use, any applicable limits, and time allowed to complete the task. New	
Emergency Plan		
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the Administrative Topics, when 5 are required.		

INDIVIDUAL WALK-THROUGH TEST OUTLINE FORM ES-301-2
Columbia Generating Station October 2004

Facility: Columbia Generating Station		Date of examination: October 2004	
Exam level: RO		/ SRO-I	
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a.	Startup RRC Pump A (Alternate Path) Simulator	N, A	1 R, I, U
b.	RFPT Startup Simulator	D	2 R, I
c.	Bypass a control rod in Rod Sequence Control System Simulator	M	7 R, I
d.	Shift Shutdown Cooling from RHR A to RHR B Simulator	N, L	4 R, I
e.	Raise Suppression Pool Level Using HPCS System Simulator	ESF, D	5 R
f.	Transfer SM-1 from TR-N to TR-S (Faulted) Simulator	D, A	6 R, I
g.	RPV Depressurization Simulator	N, L	3 R, I
h.	Prepare for Emergency Wetwell Venting (Alternate Path) Control Room	D, A	9 R, I
B2. Facility Walkthrough			
i.	Restore RPS to a Normal Alignment Starting With RPS MG A shutdown (Alternate Path) Plant	N, A, RCA	7 R, I, U
j.	Perform Fire Area R-13 section of Attachment 7.1, ABN-FIRE (Page 49 of 68) RCA	N, L, RCA	8 R, I, U
k.	Vent Overpiston Area for Control Rod Insertion Plant	D, RCA, L	1 R, I

INDIVIDUAL WALK-THROUGH TEST OUTLINE FORM ES-301-2
Columbia Generating Station October 2004

Facility: Columbia Generating Station		Date of examination: October 2004	
Exam level: RO / SRO-I			
Spare JPMs			
System / JPM Title		Type Code*	Safety Function
1.	Perform Jet Pump Operability Surveillance (Alternate Path)	N, A	1 R, I
m	Control Room Remove Decay Heat from SBGT Carbon Bed	D	9
.	Simulator		
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (L)ow power			
Indicates spare JPMs			

INDIVIDUAL WALK-THROUGH TEST OUTLINE FORM ES-301-2
Columbia Generating Station October 2004

Facility: Columbia Generating Station		Date of examination: October 2002	
Exam level:		SRO-U	
B.1 Control Room Systems			
System / JPM Title / Type Codes *		Type Code	Safety Function
a.	Startup RRC Pump A Simulator – Draft Complete	N, A	1 R, I, U
h.	Prepare for Emergency Wetwell Venting (Alternate Path) (S) Control Room – Draft Complete	D	9 R, I
b.	Override ECCS Valve Logic to Throttle RPV Injection Simulator - Complete	ESF, D	2 R, I
In-Plant Systems			
i.	Restore RPS to a Normal Alignment Starting With RPS MG A shutdown (Alternate Path) (S) RCA – Draft Complete	N, A	7 R, I, U
j.	Perform Fire Area R-13 section of Attachment 7.1, ABN-FIRE (Page 49 of 68) (S) RCA – Draft Complete	N, L,	8 R, I, U
Spare JPMs			
System / JPM Title / Type Codes *		Type Code	Safety Function
I.	Vent Overpiston Area for Control Rod Insertion LR000258 Plant	D, RCA, L	1
m.	Remove Decay Heat from SBGT Carbon Bed Simulator	D	9
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (L)ow power			
Indicates spare JPMs			

No.		Type*	
1.	Initiated by turnover T=0	N (BOP)	Place RWCU-P-1B in service and secure RWCU-P-1A.
2.	Initiated by turnover T=0	N (RO)	Perform rod over travel surveillance OSP-CRD-W701.
3.	Active at start T=15 min	C (RO)	The third rod tested fails the overtravel surveillance. The control rod is driven full in, withdrawn, and recoupled successfully.
4.	Trigger 1 T=25	I (BOP)	Main steam line flow instrument MS-DPIS-10B fails high.
5.	Trigger 2 T=45 min	C (BOP)	RWCU-P-1B trips.
6.	Trigger 3 T=55 min	M (All)	Fire alarm in the HPCS DG Room. SM-2 and SM-4 ground fault alarms and lockout of SM-2 and SM-4.
7.	Active at start of scenario	C (BOP)	Failure of SM-1, SM-2 and SM-3 to close in Startup Power on Main Turbine Trip.
8.	Active at start of scenario	C (BOP/RO)	RCIC turbine over speed trip on startup. (Loss of all high pressure injection systems.)
9.	Active at start	C (BOP/RO)	MS-RV-5B will not close when initially opened.

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

Facility: Columbia		Scenario Set No: 1		Scenario No: 5	
Examiners: _____		Operators: _____			
_____		_____			
_____		_____			
<p>Initial conditions: Plant is at approximately 20% with the main turbine generator synchronized and a startup in progress. Reactor feedwater control is in 3 element on feedpump speed control.</p> <p>Turnover: RCC-P-1A is OOS for motor replacement. BPA is selling power to CA. and power should be increased as soon as possible following turnover. The reactivity brief has been given and the power increase is to begin immediately.</p>					
Event No.	Timeline	Event Type*	Event Description		
1.	T=0	N SRO RO	Power increase with rods to 24%.		
2.	T=5	I ALL	LPRM 08-41A fails upscale. TRG-1		
3.	T=15	C SRO BOP	Failure of RB exhaust fan requires entry into PPM 5.3.1. TRG-2		
4.		I SRO RO	Failure of RFW-LIC-600 to manual. OVERRIDE TO MANUAL DURING POWER INCREASE.		
5.	T=30	M ALL	Loss of SL-81 results in a loss of RCC and subsequent trip of RWCU, RRC, and a manual reactor scram. TRG 3		
6.		M ALL	Failure of enough rods to insert such that reactor power is GT 5%. Active at the beginning of the scenario.		
7.		C SRO RO	SLC fails – neither squib valve fires. Active at the beginning of the scenario.		
8.			Termination Cue: Power is being controlled with level less than LL>		

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

Facility: Columbia

Scenario Set No: 1

Scenario No: 10

Examiners: _____

Operators: _____

Initial conditions: The plant is operating at 90% power due to economic dispatch. Power is to be increased to 100% immediately following shift turnover.

Turnover Information: HPCS-P-1 is OOS for motor bearing replacement. It is expected to be returned to service in two days. Tech. Spec. 3.5.1, condition B, was entered four hours ago. A reactivity brief for the power increase has been held and power is to be increased to 100% immediately following shift turnover. There are no pre-conditioning limits.

Event No.	Timeline	Event Type*	Event Description
1.	T=0	R SRO RO	Increase power with flow.
2.	When power = 95%	I SRO RO	APRM-A fails upscale Tech Spec TRG 1
3.	T=7	C SRO BOP	DEH-P-1A shaft break with a fail to auto start of DEH-P-1B. TRG 2
4.	T=12	C RO SRO	ASD Channel A2 alarm and fault TRG 3
5/6.	T=20	C ALL	ASD UPS trouble alarm TRG 4 Trip of E-PP-ASD1/4 and ASD CH A1 and B1 fault which results in a manual scram by the crew. TRG 5
7.	T=30	M ALL	OBE and RHR-B Suction Break with a trip of both RFW pumps. TRG 6
8.	T=31	C ALL	RCIC trips on initiation and cannot be re-started Automatic upon RCIC initiation.
9.			Termination cue: The scenario can be terminated when the ED has been performed and reactor level is being controlled in the band from +13 inches to +54 inches.

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

Event No. 1		
Description: increase reactor power with flow to 100% power.		
Time	Position	Applicants Actions or Behavior
T=0	SRO	Directs the RO to increase reactor power to 100% power with RRC flow at the rate of 10 mwe/minute.
	RO	Increases reactor power with RRC flow as directed.
	BOP	Monitors plant equipment.
COMMENTS:		