

Facility: <b>BROWNS FERRY</b>		Date of Examination: <b>JANUARY 2015</b>		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	OK		BNL
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	OK		BNL
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	OK		BNL
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	←	N/A	→
2. S I M U L A T O R	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.			
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.			
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.			
3. W /	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.		N/A	
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations			
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days			
4. G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	OK		BNL
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	OK		BNL
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	OK		BNL
	d. Check for duplication and overlap among exam sections.		N/A	
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	OK		BNL
a. Author		Printed Name/Signature		Date
b. Facility Reviewer (*)		CRAIG KONTZ		5-6-14
c. NRC Chief Examiner (#)		BRUNO CABALLERO / Bruno Caballero		5-6-14
d. NRC Supervisor		MARK A. BATES / Mark A. Bates		5-8-2014
Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required. * Not applicable for NRC-prepared examination outlines				

N-1: This Form ES-201-2 only documents the written exam outline for the BFN January 2015 Initial Exam.

Facility: Browns Ferry		Date of Exam: <u>January 2015</u>														
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	4				3	3			3	20	4	3	7
	2	1	1	1			N/A	2	0		N/A	2	7	2	1	3
	Tier Totals	5	4	5				5	3			5	27	6	4	10
2. Plant Systems	1	3	2	3	2	2	2	3	3	1	3	2	26	3	2	5
	2	1	1	2	1	1	1	1	1	1	1	1	12	0	2	3
	Tier Totals	4	3	5	3	3	3	4	4	2	4	3	38	5	3	8
3. Generic Knowledge and Abilities Categories													10			
		1	2	3	4									1	2	3
		2	3	3	2									2	2	1

Note:

1. *BN* ☒ 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. *BN* ☒ 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. *BN* ☒ Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. *BN* ☒ Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. *BN* ☒ 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. *BN* ☒ Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. *BN* ☒ The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. *BN* ☒ On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G\* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. *BN* ☒ 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) (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		(R) AA2.02			
295003 Partial or Complete Loss of AC / 6				R			(R) AA1.02			
295004 Partial or Total Loss of DC Pwr / 6	R						(R) AK1.05			
295005 Main Turbine Generator Trip / 3						R	(R) G2.4.21			
295006 SCRAM / 1		R				S	(R) AK2.06 (S) G2.4.30			
295016 Control Room Abandonment / 7						R	(R) G2.4.45			
295018 Partial or Total Loss of CCW / 8	R						(R) AK1.01			
295019 Partial or Total Loss of Inst. Air / 8			R				(R) AK3.02			
295021 Loss of Shutdown Cooling / 4	R				S		(R) AK1.01 (S) AA2.02			
295023 Refueling Acc / 8	R					S	(R) AK1.03 (S) G2.4.21			
295024 High Drywell Pressure / 5		R					(R) EK2.03			
295025 High Reactor Pressure / 3						R	(R) G2.2.44			
295026 Suppression Pool High Water Temp. / 5			R		S		(R) EK3.04 (S) EA2.03			
295027 High Containment Temperature / 5										
295028 High Drywell Temperature / 5			R		S		(R) EK3.05 (S) EA2.05			
295030 Low Suppression Pool Wtr Lvl / 5					R		(R) EA2.04			
295031 Reactor Low Water Level / 2				R			(R) EA1.04			
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1				R		S	(R) EA1.08 (S) EA2.03			
295038 High Off-site Release Rate / 9		R				S	(R) EK2.02 (S) G2.4.41			
600000 Plant Fire On Site / 8					R		(R) AA2.02			
700000 Generator Voltage and Electric Grid Disturbances / 6			R				(R) AK3.01			
K/A Category Totals:	4	3	4	3	3	3	Group Point Total:		20/7	

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(LD)

ES-401, REV 9

**T1G1 BWR EXAMINATION OUTLINE**

FORM ES-401-1

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
295001AA2.02	Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	3.1	3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Neutron monitoring.....
295003AA1.02	Partial or Complete Loss of AC / 6	4.2	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Emergency generators.....
295005G2.4.21	Main Turbine Generator Trip / 3	4.0	4.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the parameters and logic used to assess the status of safety functions
295006AK2.06	SCRAM / 1	4.2	4.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor power.....
295018AK1.01	Partial or Total Loss of CCW / 8	3.5	3.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Effects on component/system operations.....
295019AK3.02	Partial or Total Loss of Inst. Air / 8	3.5	3.4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Standby air compressor operation.....
295021AK1.01	Loss of Shutdown Cooling / 4	3.6	3.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Decay heat.....
295024EK2.03	High Drywell Pressure / 5	3.8	3.8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	LPSC: Plant-Specific.....
295026EK3.04	Suppression Pool High Water Temp. / 5	3.7	4.1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SBLC injection.....
295028EK3.05	High Drywell Temperature / 5	3.6	3.7	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor SCRAM.....
295030EA2.04	Low Suppression Pool Wtr Lvl / 5	3.5	3.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Drywell/ suppression chamber differential pressure: Mark-I&II.....

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
295031EA1.04	Reactor Low Water Level / 2	4.3	4.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High pressure core spray: Plant-Specific.....
295037EA1.08	SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	3.6	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rod control and information system: Plant-Specific...
600000AA2.02	Plant Fire On Site / 8	2.8	2.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Damper position
700000AK3.01	Generator Voltage and Electric Grid Disturbancecs	3.9	4.2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor and Turbine trip criteria
295004AK1.05	Partial or Total Loss of DC Pwr / 6	3.3	3.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Loss of breaker protection.....
295016G2.4.45	Control Room Abandonment / 7	4.1	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to prioritize and interpret the significance of each annunciator or alarm.
295023AK1.03	Refueling Acc Cooling Mode / 8	3.7	4.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inadvertent criticality.....
295025G2.2.44	High Reactor Pressure / 3	4.2	4.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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
295038EK2.02	High Off-site Release Rate / 9	3.6	3.8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Offgas system.....

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
295008G2.4.30	SCRAM / 1	2.7	4.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of events related to system operations/status that must be reported to internal organizations or outside agencies.
295021AA2.02	Loss of Shutdown Cooling / 4	3.4	3.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	RHR/shutdown cooling system flow .....
295023G2.4.21	Refueling Acc Cooling Mode / 8	4.0	4.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the parameters and logic used to assess the status of safety functions
295026EA2.03	Suppression Pool High Water Temp. / 5	3.9	4.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor pressure.....
295028EA2.05	High Drywell Temperature / 5	3.6	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Torus/suppression chamber pressure: Plant-Specific...
295037EA2.03	SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	4.3	4.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SBLC tank level.....
295038G2.4.41	High Off-site Release Rate / 9	2.9	4.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the emergency action level thresholds and classifications.

ES-401		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						R	(RS) 62.4.11			
295007 High Reactor Pressure / 3										
295008 High Reactor Water Level / 2										
295009 Low Reactor Water Level / 2				R			(AS) AA1.04			
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										
295015 Incomplete SCRAM / 1					S		(S) AA2.01			
295017 High Off-site Release Rate / 9	R						(R) AK1.02			
295020 Inadvertent Cont. Isolation / 5 & 7			R				(R) AK5.01			
295022 Loss of CRD Pumps / 1										
295029 High Suppression Pool Wtr Lvl / 5						R	(R) 62.1.7			
295032 High Secondary Containment Area Temperature / 5					S		(S) EA2.02			
295033 High Secondary Containment Area Radiation Levels / 9		R					(R) EK2.01			
295034 Secondary Containment Ventilation High Radiation / 9						S	(S) 62.4.45			
295035 Secondary Containment High Differential Pressure / 5				R			(R) EA1.01			
295036 Secondary Containment High Sump/Area Water Level / 5										
500000 High CTMT Hydrogen Conc. / 5										
K/A Category Point Totals:	1	1	1	2	0	2	Group Point Total:		7/3	

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
295002G2.4.11	Loss of Main Condenser Vac / 3	4.0	4.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of abnormal condition procedures.
295009AA1.04	Low Reactor Water Level / 2	2.7	2.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor water cleanup.....
295017AK1.02	High Off-site Release Rate / 9	3.8	4.3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Protection of the general public.....
295020AK3.01	Inadvertent Cont. Isolation / 5 & 7	3.8	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor SCRAM.....
295029G2.1.7	High Suppression Pool Wtr Lvl / 5	4.4	4.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior and instrument interpretation.
295033EK2.01	High Secondary Containment Area Radiation Levels / 9	3.8	4.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Area radiation monitoring system.....
295035EA1.01	Secondary Containment High Differential Pressure / 5	3.6	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Secondary containment ventilation system.....



KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
295015AA2.01	Incomplete SCRAM / 1	4.1	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor power.....
295032EA2.02	High Secondary Containment Area Temperature / 5	3.3	3.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equipment operability.....
295034G2.4.45	Secondary Containment Ventilation High Radiation / 9	4.1	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to prioritize and interpret the significance of each annunciator or alarm.

ES-401		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 S	(R) 62.2.38 (S) 62.2.39			
205000 Shutdown Cooling						R						(R) K6.04			
206000 HPCI		R										(R) K2.04			
207000 Isolation (Emergency) Condenser															
209001 LPCS						R				R		(R) A4.03 (R) K6.04			
209002 HPCS															
211000 SLC								R				(R) A2.05			
212000 RPS								R				(R) A2.21			
215003 IRM	R			R								(R) K1.02 (R) K4.04 (R) A1.05			
215004 Source Range Monitor					R	R					S	(R) K5.03 (S) 62.4.47			
215005 APRM / LPRM				R					S			(R) K4.01 (S) A2.04			
217000 RCIC	R											(R) K1.04			
218000 ADS					R				S			(R) K5.01 (S) A2.02			
223002 PCIS/Nuclear Steam Supply Shutoff									S		R	(R) 62.1.7 (S) A2.04			
239002 SRVs			R							R		(R) A3.02 (R) K3.03			
259002 Reactor Water Level Control			R					R				(R) A2.04 (R) K3.03			
261000 SGTS							R					(R) A1.02			
262001 AC Electrical Distribution		R										(R) K2.01			
262002 UPS (AC/DC)										R		(R) A4.01			
263000 DC Electrical Distribution	R											(R) K1.01			
264000 EDGs							R					(R) A1.01			
300000 Instrument Air										R		(R) A4.01			
400000 Component Cooling Water			R									(R) K3.01			
K/A Category Point Totals:	3	2	3	2	2	2	3	3	1	3	2	Group Point Total:	26/5		

3 2

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
203000G2.2.38	RHR/LPCI: Injection Mode	3.6	4.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of conditions and limitations in the facility license.
205000K6.04	Shutdown Cooling	3.6	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor water level
206000K2.04	HPCI	2.5	2.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Turbine control circuits: BWR-2,3,4
209001A4.03	LPCS	3.7	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Injection valves
209001K6.04	LPCS	2.8	2.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D.C. power
211000A2.05	SLC	3.1	3.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Loss of SBLC tank heaters
212000A2.21	RPS	3.6	3.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Failure of individual relays to reposition: Plant- Specific
215003K1.02	IRM	3.6	3.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor manual control
215003K4.04	IRM	2.9	2.9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Varying system sensitivity levels using range switches
215004A1.05	Source Range Monitor	3.6	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCRAM, rod block, and period alarm trip setpoints
215004K5.03	Source Range Monitor	2.8	2.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Changing detector position

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
215005K4.01	APRM / LPRM	3.7	3.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rod withdrawal blocks
217000K1.04	RCIC	2.6	2.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Main condenser
218000K5.01	ADS	3.8	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ADS logic operation
223002G2.1.7	PCIS/Nuclear Steam Supply Shutoff	4.4	4.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior and instrument interpretation.
239002A3.02	SRVs	4.3	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SRV operation on high reactor pressure
239002K3.03	SRVs	4.3	4.4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ability to rapidly depressurize the reactor
259002A2.04	Reactor Water Level Control	3.0	3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	RFP runout condition: Plant-Specific
259002K3.03	Reactor Water Level Control	2.7	2.9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rod worth minimizer: Plant-Specific
261000A1.02	SGTS	3.1	3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Primary containment pressure
262001K2.01	AC Electrical Distribution	3.3	3.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Off-site sources of power
262002A4.01	UPS (AC/DC)	2.8	3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Transfer from alternative source to preferred source

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
263000K1.01	DC Electrical Distribution	3.3	3.5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A.C. electrical distribution
264000A1.01	EDGs	3.0	3.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lube oil temperature
300000A4.01	Instrument Air	2.6	2.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pressure gauges
400000K3.01	Component Cooling Water	2.9	3.3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Loads cooled by CCWS

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
203000G2.2.39	RHR/LPCI: Injection Mode	3.9	4.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of less than one hour technical specification action statements for systems.
215004G2.4.47	Source Range Monitor	4.2	4.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.
215005A2.04	APRM / LPRM	3.8	3.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCRAM trip signals
218000A2.02	ADS	3.5	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Large break LOCA
223002A2.04	PCIS/Nuclear Steam Supply Shutoff	2.9	3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Process radiation monitoring system failures

ES-401		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								S				(S) A2.08			
201002 RMCS															
201003 Control Rod and Drive Mechanism															
201004 RSCS															
201005 RCIS								R				(R) A2.05			
201006 RWM															
202001 Recirculation								R				(R) A1.07			
202002 Recirculation Flow Control															
204000 RWCU															
214000 RPIS															
215001 Traversing In-core Probe	R										S	(R) K1.02 (S) G2.1.20			
215002 RBM															
216000 Nuclear Boiler Inst.															
219000 RHR/LPCI: Torus/Pool Cooling Mode															
223001 Primary CTMT and Aux.						R						(R) K6.10			
226001 RHR/LPCI: CTMT Spray Mode			R									(R) K3.02			
230000 RHR/LPCI: Torus/Pool Spray Mode	R											(R) K2.02			
233000 Fuel Pool Cooling/Cleanup									R			(R) A4.05			
234000 Fuel Handling Equipment															
239001 Main and Reheat Steam				R								(R) K4.05			
239003 MSIV Leakage Control															
241000 Reactor/Turbine Pressure Regulator															
245000 Main Turbine Gen. / Aux.											R	(R) G2.2.4			
256000 Reactor Condensate															
259001 Reactor Feedwater															
268000 Radwaste			R									(R) K3.02			
271000 Offgas															
272000 Radiation Monitoring								S				(S) A2.02			
286000 Fire Protection															
288000 Plant Ventilation															
290001 Secondary CTMT															
290003 Control Room HVAC									R			(R) A3.02			
290002 Reactor Vessel Internals					R							(R) K5.03			
K/A Category Point Totals:	1	1	2	1	1	1	1	1	1	1	1	Group Point Total:		12/3	

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
201006A2.05	RWM	3.1	3.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Out of sequence rod movement; P-Spec(Not-BWR6)
202002A1.07	Recirculation Flow Control	3.1	3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Recirculation loop flow: Plant-Specific
215001K1.02	Traversing In-core Probe	2.5	3.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Process computer: (Not-BWR1)
223001K6.10	Primary CTMT and Aux.	3.0	3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Containment vacuum relief system: Mark-III
226001K3.02	RHR/LPCI: CTMT Spray Mode	3.5	3.5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Containment/drywell/suppression chamber temperature
230000K2.02	RHR/LPCI: Torus/Pool Spray Mode	2.8	2.9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pumps
233000A4.05	Fuel Pool Cooling/Cleanup	2.7	3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pool temperature
239001K4.05	Main and Reheat Steam	3.1	3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Steam flow measurement
256000G2.2.4	Reactor Condensate	3.6	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.
271000K3.02	Offgas	3.3	3.9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Off-site radioactive release rate
290002K5.03	Reactor Vessel Internals	2.7	3.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Burnable poisons



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ES-401, REV 9

T2G2 BWR EXAMINATION OUTLINE

FORM ES-401-1

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
290003A3.02	Control Room HVAC	3.0	3.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Initiation/failure of fire protection system

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
201001A2.08	CRD Hydraulic	2.8	2.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inadequate system flow
215001G2.1.20	Traversing In-core Probe	4.6	4.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to execute procedure steps.
272000A2.02	Radiation Monitoring	3.3	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reactor protection system power failure

Facility: Browns Ferry		Date of Exam:					
Category	K/A #	Topic	RO		SRO-Only		
			IR	#	IR	#	
1. Conduct of Operations	2.1. 19	Ability to use plant computers to evaluate sys or comp status	3.9	1			
	2.1. 6	Ability to manage the control crew during plant transients	3.8	1			
	2.1.						
	2.1. 34	Knowledge of primary and secondary plant chemistry limits			3.5	1	
	2.1. 7	Ability to evaluate plant perf and make operational judgments			4.7	1	
	2.1.						
	Subtotal			2		2	
2. Equipment Control	2.2. 17	Knowledge of the process for managing maintenance activities	2.6	1			
	2.2. 2	Ability to manipulate the console controls as required	4.6	1			
	2.2. 40	Ability to apply Technical Specifications for a system	3.4	1			
	2.2.						
	2.2. 19	Knowledge of maintenance work order requirements			3.4	1	
	2.2. 21	Knowledge of pre- and post-maintenance operability requirements			4.1	1	
	Subtotal			3		2	
3. Radiation Control	2.3. 11	Ability to control radiation releases	3.8	1			
	2.3. 15	Knowledge of radiation monitoring systems	2.9	1			
	2.3. 7	Ability to comply with RWP requirements	3.5	1			
	2.3.						
	2.3. 14	Knowledge of radiation or contamination hazards			3.8	1	
	2.3.						
	Subtotal			3		1	
4. Emergency Procedures / Plan	2.4. 29	Knowledge of the emergency plan	3.1	1			
	2.4. 5	Knowledge of the organization of the operating proc network	3.7	1			
	2.4.						
	2.4. 11	Knowledge of abnormal condition procedures			4.2	1	
	2.4. 29	Knowledge of the emergency plan			4.4	1	
	2.4.						
	Subtotal			2		2	
Tier 3 Point Total				10		7	

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
G2.1.19	Conduct of operations	3.9	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to use plant computer to evaluate system or component status.
G2.1.6	Conduct of operations	3.8	4.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to manage the control room crew during plant transients.
G2.2.17	Equipment Control	2.6	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the process for managing maintenance activities during power operations.
G2.2.2	Equipment Control	4.6	4.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
G2.2.40	Equipment Control	3.4	4.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to apply technical specifications for a system.
G2.3.11	Radiation Control	3.8	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to control radiation releases.
G2.3.15	Radiation Control	2.9	3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of radiation monitoring systems
G2.3.7	Radiation Control	3.5	3.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.29	Emergency Procedures/Plans	3.1	4.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the emergency plan.
G2.4.5	Emergency Procedures/Plans	3.7	4.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the organization of the operating procedures network for normal, abnormal and emergency evolutions.

KA	NAME / SAFETY FUNCTION:	IR	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO											
G2.1.34	Conduct of operations	2.7	3.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of primary and secondary chemistry limits
G2.1.7	Conduct of operations	4.4	4.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior and instrument interpretation.
G2.2.19	Equipment Control	2.3	3.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of maintenance work order requirements.
G2.2.21	Equipment Control	2.9	4.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of pre- and post-maintenance operability requirements.
G2.3.14	Radiation Control	3.4	3.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities
G2.4.11	Emergency Procedures/Plans	4.0	4.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of abnormal condition procedures.
G2.4.29	Emergency Procedures/Plans	3.1	4.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Knowledge of the emergency plan.

Facility: Browns Ferry NPPDate of Examination: 01/19/2015Examination Level: ROOperating Test Number: 1501

Administrative Topic (see Note)	Type Code *	Describe activity to be performed
Conduct of Operations COO-1	N	2.1.25 2/3-EOI Appendix-9 Primary Containment Water Level Monitoring
Conduct of Operations COO-2	N	2.1.20 Reactor Recirc Pump Start Limitations
Equipment Control EC-1	N	2.2.12: 1-SI-4.7.A.2.A Complete Primary Containment Nitrogen Consumption and Leakage Surveillance, evaluate Acceptance Criteria
Radiation Control RC-1	D	2.3.7: Review of radiological survey map to determine if a task can be completed without exceeding exposure limits.
<b>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.</b>		
* Type Codes & Criteria: (C)ontrol Room (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs and RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected) (S)imulator		

Rec'd  
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**Reactor Operator**

1. 2/3-EOI Appendix-9 Primary Containment Water Level Monitoring (Unit 2 or 3)
  - **New**
  - 2/3-EOI Appendix-9 Primary Containment Water Level Monitoring and Equipment Control
  - With Primary Containment Flooding in progress, determine Primary Containment water level in accordance with 2/3-EOI Appendix-9 attachment 2
  - 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. Importance RO 3.9
2. Determine if a Reactor Recirc Pump can be started (Unit 2 or 3)
  - **New**
  - 2/3-SR-3.4.9.3&4, Reactor Recirculation Pump Start Limitations
  - Perform 2/3-SR-3.4.9.3&4 and determine that one Recirc Pump can be started
  - 2.1.20 Ability to interpret and execute procedure steps RO 4.6*Surveillance Testing*
3. Complete Primary Containment Nitrogen Consumption and Leakage Surveillance and evaluate Acceptance Criteria (Unit 1)
  - **New**
  - 1-SI-4.7.A.2.A, Primary Containment Nitrogen Consumption and Leakage
  - Completes Surveillance and determines that it does meet acceptance criteria.
  - 2.2.12 Knowledge of surveillance procedures. RO 3.7
4. Review of radiological survey map to determine if a task can be completed without exceeding exposure limits
  - **Direct from Bank**
  - Calculates whole body dose to complete assigned tasks and determines that both the TVA annual limit and the dose margin will be exceeded.
  - 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. Importance RO 3.5

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Facility: BFNDate of Examination: 01/19/2015Examination Level: SROOperating Test Number: 1501

Administrative Topic (see Note)	Type Code *	Describe activity to be performed
Conduct of Operations COO-1	N	2.1.25 2/3-EOI Appendix-9 Primary Containment Water Level Monitoring
Conduct of Operations COO-2	N	2.1.20 Reactor Recirc Pump Start Limitations
Equipment Control EC-2	P	2.2.23: LCO Tracking Log entry for RWCU PCIS Valves failed
Radiation Control RC-1	D	2.3.7: Review of radiological survey map to determine if a task can be completed without exceeding exposure limits.
Emergency Plan EP-1	D	2.4.41 Knowledge of the emergency action level thresholds and classifications.
<b>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.</b>		
* Type Codes & Criteria: (C)ontrol Room (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs and RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected) (S)imulator		

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## Senior Reactor Operator

1. 2/3-EOI Appendix-9 Primary Containment Water Level Monitoring (Unit 2 or 3)
  - **New**
  - 2/3-EOI Appendix-9 Primary Containment Water Level Monitoring and Equipment Control
  - With Primary Containment Flooding in progress, determine Primary Containment water level in accordance with 2/3-EOI Appendix-9 attachment 2
  - 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. Importance RO 3.9
2. Determine if a Reactor Recirc Pump can be started (Unit 2 or 3)
  - **New**
  - 2/3-SR-3.4.9.3&4, Reactor Recirculation Pump Start Limitations
  - Perform 2/3-SR-3.4.9.3&4 and determine that the A Recirc Pump can be started
  - 2.1.20 Ability to interpret and execute procedure steps RO 4.6
3. LCO Tracking Log entry for failed PCIS Valve
  - **Previous**
  - OPDP-8
  - Complete an LCO Tracking Log Entry from the results of 1/2/3-SR-3.6.1.3.5(RWCU) RWCU Primary Containment Isolation Valve Operability
  - 2.2.23 Ability to track Technical Specifications limiting conditions for Operations. Importance SRO 4.6
4. Review of radiological survey map to determine if a task can be completed without exceeding exposure limits
  - **Direct from Bank**
  - Review of radiological survey map to determine if a task can be completed without exceeding exposure limits.
  - 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. SRO 3.6
5. Classify the event per REP (Uncontrolled water level decrease in SFSP)
  - **Direct From Bank**
  - The event is classified as an ALERT based on uncontrolled water level decrease in spent fuel pool with irradiated fuel assemblies expected to result in irradiated fuel assemblies being uncovered.
  - 2.4.41 Knowledge of the emergency action level thresholds and classifications. Importance SRO 4.6

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Facility: Browns Ferry NPPDate of Examination: 1/19/2015Exam Level: ROOperating Test No.: 1501**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. Control Room Transfer of Recirc Pump Bd 2A; Respond to Recirculation Loop A Speed Control Failure 2-AOI-68-3	A, N, S	1
b. HPCI started in Level Control IAW 2/3-EOI Appendix-5D/ Respond to HPCI Turbine Exh Rupture Disc Pressure High	A, N, S	2
c. Place SDC in service IAW 2/3-EOI Appendix 17D	N, L, S	4
d. RPS MSIV 2/3-SR-3.3.1.1.8(5) w/partial closure of MSIV at power (2/3-AOI-1-3)	A, N, S	7
e. 2/3-EOI Appendix-13, Emergency Vent	A, D, EN, S	5
f. Restore Offsite Power to 4KV Shutdown Bd 0/3-OI-82	D, S	6
g. Restore Fuel Pool Level IAW Fuel Pool Failure 2/3-AOI-78-1	D, S	9
h. 2/3-EOI Appendix-8G Crosstie CAD to Drywell Control Air (RO Only)	D, S	3

**In-Plant Systems<sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)**

i. Vent Scram Air Header	D, R, E	1
j. Stuck open SRV	A, D, R, E	3
k. Reset the Unit 1 Excess Flow Check Valve	N, R	8

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path (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	4-6/2-3  $\leq 9/\leq 8/\leq 4$ $\geq 1/\geq 1/\geq 1$ - / - / $\geq 1$ (control room system) $\geq 1/\geq 1/\geq 1$ $\geq 2/\geq 2/\geq 1$ $\leq 3/\leq 3/\leq 2$ (randomly selected) $\geq 1/\geq 1/\geq 1$

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Facility: Browns Ferry NPPDate of Examination: 1/19/2015Exam Level: SRO-IOperating Test No.: 1501**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. Control Room Transfer of Recirc Pump Bd 2A; Respond to Recirculation Loop A Speed Control Failure 2-AOI-68-3	A, N, S	1
b. HPCI started in Level Control IAW 2/3-EOI Appendix-5D/ Respond to HPCI Turbine Exh Rupture Disc Pressure High	A, N, S	2
c. Place SDC in service IAW 2/3-EOI Appendix 17D	N, L, S	4
d. RPS MSIV 2/3-SR-3.3.1.1.8(5) w/partial closure of MSIV at power (2/3-AOI-1-3)	A, N, S	7
e. 2/3-EOI Appendix-13, Emergency Vent	A, D, EN, S	5
f. Restore Offsite Power to 4KV Shutdown Bd 0/3-OI-82	D, S	6
g. Restore Fuel Pool Level IAW Fuel Pool Failure 2/3-AOI-78-1	D, S	9

**In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)**

i. Vent Scram Air Header	D, R, E	1
j. Stuck open SRV	A, D, R, E	3
k. Reset the Unit 1 Excess Flow Check Valve	N, R	8

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6/2-3
(C)ontrol room	
(D)irect from bank	$\leq 9/\leq 8/\leq 4$
(E)mergency or abnormal in-plant	$\geq 1/\geq 1/\geq 1$
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)
(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	

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Facility: Browns Ferry NPPDate of Examination: 1/19/2015Exam Level: SRO-UOperating Test No.: 1501**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.		
b. HPCI started in Level Control IAW 2/3-EOI Appendix-5D/ Respond to HPCI Turbine Exh Rupture Disc Pressure High	A, N, S	2
c. Place SDC in service IAW 2/3-EOI Appendix 17D	N, L, S	4
d.		
e. 2/3-EOI Appendix-13, Emergency Vent	A, D, EN, S	5
f.		
g.		
h.		

**In-Plant Systems<sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)**

i.		
j. Stuck open SRV	A, D, R, E	3
k. Reset the Unit 1 Excess Flow Check Valve	N, R	8

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6/2-3
(C)ontrol room	
(D)irect from bank	$\leq 9/\leq 8/\leq 4$
(E)mergency or abnormal in-plant	$\geq 1/\geq 1/\geq 1$
(EN)gineered safety feature	- / - / $\geq 1$ (control room system)
(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	

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**Control Room Systems:**

- a. **Control Room Transfer of Recirculation Pump Board 2A; Respond to Recirculation Loop A Speed Control Failure (Unit 2)**
- New / Simulator / Alternate Path
  - 0-OI-57A, Switchyard and 4160V AC Electrical System; 2-AOI-68-3 Recirculation Loop A or B Speed Control Failure
  - 202001 Recirculation System A2.06 Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Inadvertent recirculation flow decrease IMPORTANCE: RO 3.6 SRO 3.8
  - Operator directed to perform a control room transfer of Recirc Pump Board 2A from normal to alternate IAW 0-OI-57A. Subsequently, as RR Pump 2A speed recovers from the transfer it will experience a speed control failure, and the operator will respond IAW 2- AOI-68-3.
- b. **HPCI started in Level Control IAW 2/3-EOI Appendix-5D/Respond to HPCI Turbine Exh Rupture Disc Pressure High (Unit 2 or 3)**
- Alternate Path / New / Simulator / Low Power
  - 2/3-EOI Appendix-5D Injection System Lineup HPCI / 2/3-ARP-9-3F
  - 206000 High Pressure Coolant Injection System A2.10 Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System Isolation. IMPORTANCE: RO 4.0 SRO 4.1
  - The operator starts HPCI for level control IAW 2/3-EOI Appendix-5D. Subsequently, HPCI experiences a failure to isolate on HPCI Turbine Exhaust Rupture Disc High Pressure and must respond IAW 2/3-ARP-9-3F (window 17) and Trip HPCI and manually close the HPCI Stm Line Inbd and outboard Isol Valves.
- c. **Place RHR in Shutdown Cooling in accordance with EOI Appendix 17D (Unit 2 or 3)**
- New / Simulator / Low Power
  - 2/3-EOI Appendix-17D, RHR System Operation Shutdown Cooling
  - 205000 Shutdown Cooling System (RHR Shutdown Cooling Mode) A4.01 Ability to manually operate and/or monitor in the control room: SDC/RHR Pumps IMPORTANCE: RO 3.7 SRO 3.7
  - Operator places Loop I of RHR in SDC IAW EOI Appendix 17D.

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**d. 2/3-SR-3.3.1.1.8(5) MSIV Closure- RPS Trip Channel Functional Test/MSIV Partial Closure At Power (Unit 2 or 3)**

- New / Alternate Path / Simulator
- 2/3-SR-3.3.1.1.8(5) MSIV Closure- RPS Trip Channel Functional Test
- 2/3-ARP-9-5B; 2/3-ARP-9-4A; 2/3-AOI-1-3, MSIV Closure at Power
- 212000 Reactor Protection System A2.11 Ability to (a) predict the impacts of the following on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Main steamline isolation valve closure IMPORTANCE: RO 4.0 SRO 4.1
- Operator directed to perform control room operations for MSIV Closure- RPS Trip Channel Functional Test IAW 2-SR-3.3.1.1.8(5). Subsequently, the operator will respond to a Partial MSIV Closure at Power IAW with 2/3-AOI-1-3 by reducing power to <66% and placing the associated MSIV in CLOSE.

**e. 2/3-EOI Appendix-13, Emergency Vent (Unit 2 or 3)**

- Alternate Path /ENGINEERED Safety Feature /Direct from Bank /Simulator
- 2/3-EOI Appendix-13, Emergency Venting Primary Containment
- 223001 Primary Containment System and Auxiliaries A2. Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.07 High drywell pressure IMPORTANCE RO 4.2 SRO 4.3
- Operator is directed to emergency vent Primary Containment to restore and maintain Drywell Pressure below 55 psig as directed by 2/3-EOI Appendix-13, Emergency Venting Primary Containment. Emergency Venting of the Suppression Chamber through the Hardened Wetwell Vents will be unsuccessful and the operator will vent the Drywell to Secondary Containment via Primary Containment vent duct failure.

**f. Restore Offsite Power to 4KV Shutdown Bd (Unit 2 or 3)**

- Modified / Simulator / Low Power
- 0/3-OI-82, Standby Diesel Generator System
- 264000 Emergency Generators (Diesel/Jet) A2.01 Ability to (a) predict the impacts of the following on the EMERGENCY GENERATORS (DIESEL/JET) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Parallel operation of emergency generator IMPORTANCE: RO 3.5 SRO 3.6
- Operator performs operations necessary to restore offsite power to 4kV SD BD A/3EA.

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**g. Restore Fuel Pool Level IAW Fuel Pool Failure**

- Direct from bank / Simulator
- 2/3-AOI-78-1, Fuel Pool Cleanup System Failure
- 233000 Fuel Pool Cooling and Clean-up A2.02 Ability to (a) predict the impacts of the following on Fuel Pool Cooling and Clean-up; and (b) based on those predications, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low pool level IMPORTANCE: RO 3.1 SRO 3.3
- Operator commences to restore Fuel Pool level IAW 2/3-AOI-78-1.

**h. Cross-Tie CAD to Drywell Control Air (Unit 2 and 3)**

- Direct from Bank / Simulator
- 2/3-EOI Appendix-8G Crosstie CAD to Drywell Control Air
- 218000 Automatic Depressurization System A2. Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION SYSTEM ; 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 air supply to ADS valves: IMPORTANCE: RO 3.4 SRO 3.6
- Operator crossties CAD to Drywell Control Air IAW 2/3-EOI Appendix-8G.

**In-Plant Systems:****i. Vent the SCRAM pilot Air Header IAW 1/2/3-EOI Appendix-1B (U1/U2/U3)**

- Direct from Bank / Emergency or Abnormal In-Plant / RCA Entry
- EOI Appendix-1B, Venting and Repressurizing the SCRAM Pilot Air Header
- 201003 Control Rod and Drive Mechanism 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: A2.05 Reactor Scram IMPORTANCE RO 4.1 SRO 4.1
- Simulate component manipulations required to vent and subsequently re-pressurize the scram pilot air header as directed by EOI Appendix-1B.

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**j. Stuck Open SRV 1-22 (Unit 3)**

- Direct from Bank / RCA Entry / Emergency or Abnormal In-Plant / Alternate Path
- 3-AOI-1-1 Relief Valve Stuck Open
- 239002 Relief / Safety Valves A2.03 Ability to (a) predict the impacts of the following on the RELIEF/SAFETY VALVES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Stuck open SRV IMPORTANCE: RO 4.1 SRO 4.2
- Operator attempts to close a stuck open SRV from the Remote Shutdown Panel, when that fails the operator opens the supply breakers or removes fuses to remove power from the SRV. The SRV will close when power is removed.

**k. Reset the Unit 1 Excess Flow Check Valve**

- New / RCA Entry
- 0-OI-32, Control Air System
- 300000 Instrument Air System (IAS) 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: A2.01 Air dryer and filter malfunctions IMPORTANCE RO 2.9 SRO 2.8
- Simulates field actions to Reset the Unit 1 Excess Flow Check Valve in accordance with 0-OI-32.

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Facility: BFNScenario Number: NRC - 1Op-Test Number: 1501Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: SRO: \_\_\_\_\_  
ATC: \_\_\_\_\_  
BOP: \_\_\_\_\_

**Initial Conditions:** Unit 1, 2, and 3 Reactor Power is approximately 100%. 2A CCW pump was removed from service for breaker PMs and is ready to be returned to service.

**Turnover:**

Return the 2A CCW pump to service IAW 2-OI-27 section 8.3. Southwest Load Dispatch is anticipating a power system alert starting this evening due to a cold front moving through the area.

Event Number	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP N-SRO	Return the 2A CCW pump to service IAW 2-OI-27 section 8.3 (T-Mod-BFN-2-2013-010).
2	nm07	I-BOP <u>TS-SRO</u>	Respond to an LPRM downscale alarm and bypass the failed detector.
3	N/A	M-precursor	The U1 US reports that 1-XA-55-22C window 5 Start of Strong Motion Accelerograph is in alarm. 0-AOI-100-5 Earthquake is entered and the SM and U1 US are evaluating 4.2[1] through [10] to determine if shutting down is required
4	N/A	R-ATC R-SRO	The SM directs initiating a Reactor Shutdown IAW 2-GOI-100-12A. The Reactor Engineer recommends using the urgent load reduction RCP initially to lower core flow to 60%.
5	rd01a	C-ATC C-SRO	CRD pump 2A trips respond IAW 2-AOI-85-3
6	rc09 rc10	C-BOP TS-SRO	RCIC steam leak failure of RCIC to auto isolate
7	fw19	M-ALL	FW A line break-SCRAM
8	override	C-ATC	2C RFP discharge valve fails to close
9	N/A	C-BOP	HPCI is manually secured due to pumping out the feedwater break

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

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**Events**

1. The crew will conduct a pre-job brief for placing the 2A CCW pump in service. The BOP operator will place 2A CCW pump in service per 2-OI-27 section 8.3 which has incorporated T-MOD-BFN-2-2013-010. Once the pump is in service the scenario may continue.
2. The crew will respond to 2-XA-55-5A window 5, LPRM Downscale. The BOP operator will bypass the failed LPRM IAW 2-OI-92B. The SRO will determine that the affected APRM/OPRM and RBM remain operable. Once the Tech Spec Call has been made and the LPRM bypassed, the scenario may continue.
3. The U1 US reports that 1-XA-55-22C window 5; Start of Strong Motion Accelerograph is in alarm. 0-AOI-100-5 Earthquake is entered and the SM and U1 US are evaluating steps 4.2[1] through [10] to determine if shutting down is required. The crew will monitor the plant for abnormal conditions and as soon as the lead examiner is ready to move on, the next event can be initiated.
4. The crew will enter 2-GOI-100-12A and the Urgent Load Reduction RCP. The ATC will lower Reactor Recirc flow to 60% IAW step 1A of the RCP. When the Lead Examiner is satisfied with the Reactivity manipulation the scenario may continue.
5. The 2A CRD pump will trip. The ATC operator will perform the immediate operator actions of 2-AOI-85-3 to place the 1B CRD pump in service. The ATC operator will verify 1B CRD pump is in service and perform the subsequent actions of the AOI. Once the CRD system flows and pressures have been restored to their pre-trip conditions the scenario may continue.
6. RCIC will receive an isolation signal due to a steam leak in the RCIC pump room with a failure to automatically isolate. The US will enter EOI-3 and 2-AOI-64-2C, and the BOP operator will perform actions necessary to isolate RCIC (manually closing 2-FCV-71-2 and 3). The SRO will determine RCIC system inoperable and RCIC isolation valves inoperable. (TS 3.5.3 Condition A, 3.6.1.3 Condition B). Once the steam leak has been terminated (i.e. Steam Valves closed) and the Tech Spec call has been made the scenario may continue.
7. Once the plant is stable, the 'A' Feedwater line will break in the Steam Tunnel. A scram will be inserted due to loss of feedwater and lowering reactor water level. The crew will isolate the feedwater system. The crew will respond IAW EOI-1 and EOI-3. Reactor water level will not be able to

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be maintained above (-) 162 inches and the US will enter C-1. When Reactor Water Level lowers to (-) 162 inches the crew will verify Low Pressure injection systems aligned and running then perform an ED and recover Reactor Water Level using Low pressure systems.

8. Following the 'A' Feedwater line break the 2C RFP discharge valve will fail to close. The ATC operator will close the 2C RFP suction valve to complete the Feedwater isolation.
9. The BOP operator will manually trip and lock out HPCI due to pumping out the feedwater line break.

The Scenario ends when the crew has performed an emergency depressurization and re-established Reactor Water Level above the top of active fuel (-) 162 inches.

Rec'd  
10/24/10

**Critical Tasks 4**

1. **With a primary system discharging into secondary containment, take action to manually isolate the leak.**
  1. Safety Significance  
Isolating high energy sources can preclude failure of secondary containment and subsequent radiation release to the public
  2. Cues  
Procedural compliance  
Secondary Containment Area Temperature and Radiation indications
  3. Measured by  
Operator action to isolate the leak
  4. Feedback  
Valve position indication and lowering Area Temperature
2. **To prevent an uncontrolled RPV depressurization when Reactor Water Level cannot be restored and maintained above -162 inches, inhibit ADS.**
  1. Safety Significance  
Maintain adequate core cooling  
Prevent degradation of fission product barrier
  2. Cues  
Procedural compliance
  3. Measured by  
ADS logic inhibited prior to automatic initiation
  4. Feedback  
RPV Pressure and Water level trend  
ADS LOGIC BUS A/B INHIBITED annunciators

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3. **With a(n) injection system(s) operating and lined up for injection, before RPV water level reaches -180", initiate Emergency Depressurization.**
  1. Safety Significance:  
Maintain adequate core cooling  
Prevent degradation of fission product barrier
  2. Cues:  
Procedural compliance  
Reactor Water level trend
  3. Measured by:  
Observation: US direct Emergency Depressurization before RPV level lowers to -180 inches.
  4. Feedback:  
Reactor Pressure trend  
SRV status indications
4. **With RPV pressure below the Shutoff Head of the available Low Pressure system(s), operate available Low Pressure system(s) to restore RPV water level above TAF.**
  1. Safety Significance:  
Maintain adequate core cooling  
Prevent degradation of fission product barrier.
  2. Cues:  
Procedural compliance  
Pressure below low pressure ECCS system(s) shutoff head
  3. Measured by:  
Operator manually starts or initiates at least one low pressure ECCS system and injects into the RPV to restore water level above TAF
  4. Feedback:  
Reactor pressure trend  
Reactor water level trend

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Facility: BFNScenario Number: NRC - 2Op-Test Number: 1501Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: SRO: \_\_\_\_\_  
ATC: \_\_\_\_\_  
BOP: \_\_\_\_\_

**Initial Conditions:** Reactor Power is 100%. The Steam Tunnel booster fan is tagged out for lubrication PMs. Suppression Pool Cooling is in service due to a HPCI flow rate test on the previous shift.

**Turnover:** Secure Suppression Pool Cooling. MIG signed on and will be performing 2-SR-3.3.6.1.5(4A/A) Core and Containment Cooling Systems RCIC Turbine Steam Line High Flow Instrument Channel A Calibration.

Event Number	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP N-SRO	Secure from Suppression Pool Cooling using 2-OI-74
2	N/A	I-SRO TS-SRO	MIG reports that 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized and that they have stopped at step 7.4[7]B.
3	Override 2B SPE Auto	C-BOP C-SRO	The 2A Steam Packing Exhauster will trip and the 2B Steam Packing Exhauster will not auto start.
4	SW10A	C-ATC C-SRO	The 2A Fuel Pool Cooling pump will Trip.
5	TH12B	C-ATC C-SRO	Recirc Pump 2B vibration high
6	TH10B	R-ATC C-BOP TS-SRO	Recirc Pump 2B seal failure/2-AOI-68-1A
7	TH22 RH01A&C RH06B	M-All	LOCA/Scram with inability to spray the Drywell/C4
8	TC02	C-BOP C-SRO	SRO directs cool down or rapid depressurization of the RPV using Turbine bypass valves however they fail closed and ED will be required.
9	CS02A&B	C-BOP	Core Spray Loop II injection valve will fail to open on initiation signal but can be manually opened.

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

1, 2, 5, 6, 3, 4

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**Events**

1. The BOP operator will secure from Suppression Pool Cooling using 2-OI-74. When Suppression Pool Cooling is secured the scenario may continue.
2. The Instrument Mechanic Foreman will call the SRO and report that during performance of 2-SR-3.3.6.1.5(4A/A), Core and Containment Cooling Systems RCIC Turbine Steam Line High Flow Instrument Channel A Calibration, 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized and that they have stopped at step 7.4[7]B. The SRO will evaluate Tech Spec 3.3.6.1 and table 3.3.6.1-1 to determine that function 4a is the affected function and that the Tech Spec requires placing the channel in trip within 24 hours. Once the Tech Spec call is completed the scenario may continue.
3. The running steam packing exhaustor will trip and the standby exhaustor will fail to auto start. The BOP operator will place the standby steam packing exhaustor in service IAW 2-OI-47C section 6.3. While the BOP operator is adjusting to obtain 10-12 inches of H<sub>2</sub>O vacuum the scenario may continue.
4. The 2A Fuel Pool Cooling pump will trip. The SRO will direct the ATC to enter 2-AOI-78-1 and the 2B Fuel Pool Cooling pump will be placed in service IAW 2-AOI-78-1 step 4.2[3]. When the 2B Fuel Pool Cooling pump is in service and the lead examiner is ready the scenario may continue.
5. 2-XA-55-4B window 20 RECIRC Pump Motor B Vibration High alarms. The BOP operator will dispatch an AUO to 2-LPNL-925-0712 and he/she will report that 2-XI-68-71D and E are in alarm reading 12.0 mils and rising slowly. The SRO will direct lowering 2B Recirc speed to attempt to clear the alarm. The ATC operator will lower 2B Recirc pump speed. The AUO will report that 2-XI-68-71D and E lowered to ~10 mils and will reset the alarm locally. When the lead examiner is ready the scenario may continue.
6. 2-XA-55-4B window 20, RECIRC Pump Motor B Vibration High alarms again and 2-XA-55-4B, window 25 Recirc Pump B no. 1 Seal Leakage ABN, alarms. The number 2 seal pressure will rise to approximately Reactor Pressure. The SRO will direct tripping the 2B Recirc Pump and entering 2-AOI-68-1A. The ATC operator will lower Reactor Power IAW the RCP and 2-AOI-68-1A. The BOP operator will carry out the subsequent actions of the AOI. The SRO will address Tech Spec 3.4.1. When conditions have stabilized and the lead examiner is ready the scenario may continue.

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7. A leak in the Drywell will develop causing Drywell Temperature and Pressure to rise. The SRO will set a trigger value for a Reactor Scram and when that value is reached a manual Scram will be inserted or the Reactor will Scram at 2.45 psig Drywell Pressure. All control rods will be inserted on the scram. The SRO will direct entry into 2-AOI-100-1. The SRO will direct Suppression Chamber spray per EOI-2 Appendix 17C. The BOP operator will attempt to spray the Suppression Chamber however the First loop attempted the RHR pumps will trip. The BOP operator will attempt to spray the Suppression Chamber with the Second loop of RHR however the select logic will fail. If the SRO directs spraying the Suppression Chamber with Standby coolant or Fire Protection using RHR loop 1, the breaker for 2-FCV-074-0100 (480V RMOV BD 1B compartment 19A) or RHR loop II the breaker for 2-FCV-074-0101 (480V RMOV BD 3B compartment 19E) will not close.

The SRO/BOP operator will determine that neither the Suppression Chamber nor the Drywell can be sprayed. The SRO may attempt to cool down or anticipate that an ED will be required and attempt to rapidly depressurize the Reactor using the bypass valves however the bypass valves will fail closed. An ED will be required based on Drywell Temperature or the PSP curve. As the Reactor depressurizes the action required area of curve 8 RPV Saturation Temp will be entered and Reactor Water Level indication will be lost. The SRO will direct entry into C-4 and the crew will inject using available systems until the Main Steam Lines are flooded.

8. When the SRO directs a cool down or rapid depression of the RPV using the main turbine bypass valves, the operator will determine and report that the bypass valves have failed closed. This will lead to an ED being required.
9. With an accident signal present the Core Spray loop II injection valve will fail to automatically open, the BOP operator will manually open the injection valve.

The Scenario ends when the crew has performed an emergency depressurization and flooded the RPV to the Main Steam Lines.

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**Critical Tasks 2**

- 1. When Suppression Chamber pressure cannot be maintained within the safe area of Curve 6 (PSP) the SRO determines that Emergency Depression is required and is initiated as directed by the SRO.**

1. Safety Significance  
Precludes failure of Primary Containment
2. Cues  
Procedural compliance  
High Suppression Chamber or Drywell pressure
3. Measured by  
Observation-SRO updates or briefs the crew that ED is required based on exceeding PSP curve AND the operator opens 6 ADS/MSRVs
4. Feedback  
MSRV open indications  
RPV Pressure lowering

**OR**

- 1. When Drywell temperature cannot be restored and maintained below 280°F the SRO determines that Emergency Depression is required and is initiated as directed by the SRO.**

1. Safety Significance  
Precludes failure of Primary Containment
2. Cues  
Procedural compliance  
High Drywell temperature
3. Measured by  
Observation-SRO updates or briefs the crew that ED is required based on Drywell temperature AND the operator opens 6 ADS/MSRVs
4. Feedback  
MSRV open indications  
RPV Pressure lowering

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**2. With Reactor Water Level unknown, inject into the RPV with available sources until there is indication that the Main Steam Lines are flooded (C-4 Note 7) and maintain them flooded.**

1. Safety Significance  
Prevent fuel damage by establishing adequate core cooling
2. Cues  
Procedural compliance  
Loss of all RPV level indications
3. Measured by  
Observation-Indications that the Main Steam Lines are flooded are listed in C-4 Note 7
4. Feedback  
MSRV tail pipe temperature  
MSRV acoustic monitor  
RPV Pressure trend

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Facility: BFNScenario No.: NRC - 3Op-Test No.: 1501

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

Operators: SRO: \_\_\_\_\_

ATC: \_\_\_\_\_

BOP: \_\_\_\_\_

**Initial Conditions:** Reactor Power is 5%. Unit1 and Unit 2 are at 100% power.**Turnover:** Perform EHC Auto Pump Start Test & Weekly Pump Alternation IAW 3-OI-47A, Sec. 6.2. Continue plant startup IAW 3-GOI-100-1A section 5.4, mode change from Mode 2 to Mode 1.

Event Number	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP N-SRO	Perform EHC Auto Pump Start Test & Weekly Pump Alternation IAW 3-OI-47A, Sec. 6.2
2	N/A	R-ATC R-SRO	Power increase with Control Rods to 8% IAW GOI
3	RD07R0239 RD06R0239	C-ATC TS-SRO	Control Rod Drift in
4	OG04A	C-BOP C-SRO	Loss of SJAE 'A' / Swap to STBY SJAE 'B'
5	NM05	I-ATC TS-SRO	IRM 'C' Failure Upscale/Half Scram
6	DG03D	<del>C-ATC</del> C-BOP TS-SRO	Loss of 4KV Shutdown Board 3ED, 3D D/G fails to AUTO tie
7	FW14C	C-ATC C-SRO	Trip of RFP 3C/ recover with already warm RFP 3B
8	PC 14 (e20 0) 100 300 75	M-ALL	Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level
9	FW30	C-ATC	Failure of RFP 3B governor/pump needs tripped.
10	AD01D AD01E	C-BOP C-SRO	ADS SRV Failures

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

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## Events

1. The BOP Operator will perform EHC Auto Pump Start Test & Weekly Pump Alternation IAW 3-OI-47A, Section 6.2. Once the EHC Pumps have been swapped the scenario may continue.
2. ATC will withdraw control rods in order to raise power to 8% for a mode change from 2 to 1. Once the Chief Examiner has seen an appropriate amount of power rise he may choose to continue with the next event which will halt control rod withdrawal.
3. Control Rod xx-xx will begin to drift in to approximately position 10, and the ATC will respond IAW 3-AOI-85-5 and bypass the RWM and insert Control Rod xx-xx to position 00. The SRO will declare Control Rod xx-xx inoperable and refer to Tech Spec 3.1.3 condition C. The SRO will also refer to Tech Spec 3.1.6 condition A for BPWS and 3.3.2.1 condition C for RWM. Once the rod has been inserted and the Tech Spec call has been made the scenario may continue.
4. Loss of SJAE A, BOP operator swaps to B SJAE IAW 3-AOI-47-3, Loss of Condenser Vacuum or IAW 3-OI-66 or the hardcard. After the standby SJAE has been placed in service and Main Condenser vacuum has recovered, the scenario may continue.
5. The ATC will respond to a failure of IRM 'C' upscale. IRM 'C' will be bypassed IAW 3-AOI-92-A, section 6.1. The SRO will refer to Tech Spec 3.3.1.1 and enter an Information Only LCO due to 7/8 IRMs remaining operable. After the BOP Operator bypasses the failed LPRM and the SRO has completed the Tech Spec call the scenario may continue.
6. 3ED 4KV Shutdown Board will lose power and the 3D Diesel Generator will fail to automatically tie to the Shutdown Board. The BOP will manually tie the Diesel to the board. SRO will refer to Tech Specs and determine TS 3.8.1 condition A, B, and G, and TS 3.8.7.A. The ATC will be resetting RPS and PCIS. After the BOP Operator ties the Diesel to the Buss and the SRO has completed the Tech Spec call the scenario may continue.
7. The ATC will respond to a trip of the 3C RFP IAW 3-AOI-3-1 by raising the speed of the warm RFP 3B to feed the RPV. Once the ATC has entered AOI-3-1 and raised the speed on the standby Reactor Feedpump to maintain RPV Water Level the scenario may continue.
8. At the cue of the Chief Examiner initiate the next event. An unisolable leak will develop on the suppression chamber. The US will direct entry into EOI-3 on secondary containment area flood alarms and EOI-2 on suppression pool water

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level. Prior to 12.75 ft, in the Suppression Pool, the US will direct HPCI to be secured and locked out. Prior to 11.5 ft in the Suppression Pool the US will transition to EOI-1 and direct a SCRAM. An ATWS will exist on the SCRAM. The crew will work through EOI-1 and C-5 to insert control rods, maintain reactor water level, and reactor pressure. The US will transition to C-2 to emergency depressurize before Suppression Pool water level lowers to 11.5 feet.

9. The US will direct terminating and preventing IAW EOI appendix 4, and the 3B RFP governor will fail as is. The ATC/BOP will Trip the 3B RFP.
10. The BOP will report that two of the ADS SRV's failed for Emergency Depressurization. Two additional non ADS SRV's will be opened at the direction of the SRO.

The Scenario ends when Emergency Depressurization and Reactor Water Level is restored and maintained within the assigned band or upon request of Lead Examiner.

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**Critical Tasks 4****1. When Suppression Pool Level cannot be maintained above 12.75 feet HPCI secured to prevent damage.**

1. Safety Significance:  
Prevent failure of Primary Containment from pressurization of the Suppression Chamber
2. Cues:  
Procedural compliance  
Suppression Pool Level indication
3. Measured by:  
Observation – HPCI Auxiliary Pump placed in Pull to Lock
4. Feedback:  
HPCI does not Auto initiate  
  
No RPM indication on HPCI

**2. When Suppression Pool level cannot be maintained above 11.5 feet the US determines that Emergency Depressurization is required, RO initiates Emergency Depressurization as directed by US.**

1. Safety Significance:  
Precludes failure of Containment.
2. Cues:  
Procedural compliance.  
Suppression Pool Level Trend.
3. Measured by:  
Observation - US determines (indicated by announcement or observable transition to C-2) that Emergency Depressurization is required before Suppression Pool level drops below 11.5 feet.

**AND**

Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions.

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4. Feedback:
  - RPV pressure trend.
  - SRV status indications.
  - Suppression Pool temperature trend.
3. **During an ATWS, when conditions with Emergency Depressurization required, Terminate and Prevent RPV injection from ECCS and Feedwater until reactor pressure is below the MARFP as directed by US.**

1. Safety Significance:
  - Prevention of fuel damage due to uncontrolled feeding.
2. Cues:
  - Procedural compliance.
3. Measured by:
  - Observation - No ECCS injection prior to being less than the MARFP.

**AND**

Observation - Feedwater terminated and prevented until less than the MARFP.

4. Feedback:
  - Reactor power trend, power spikes, reactor short period alarms.
  - Injection system flow rates into RPV.

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**4. With RPV pressure <MARFP, slowly increase and control injection into RPV to restore and maintain RPV level above TAF as directed by US.**

**1. Safety Significance:**

Maintaining adequate core cooling and preclude possibility of large power excursions.

**2. Cues:**

Procedural compliance.  
RPV pressure indication.

**3. Measured by:**

Observation - Injection not commenced until less than MARFP, and injection controlled such that power spikes are minimized, level restored and maintained greater than TAF.

**4. Feedback:**

RPV level trend.  
RPV pressure trend.  
Injection system flow rate into RPV.

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Facility: BFNScenario No.: NRC - 4Op-Test No.: 1501

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

Operators: SRO: \_\_\_\_\_

ATC: \_\_\_\_\_

BOP: \_\_\_\_\_

**Initial Conditions:** Reactor Power is 100%. EECW Pump A3 and Steam Packing Exhauster 3A are out of service.

**Turnover:** Lower reactor power to <95% to conduct Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9). The Spare RBCCW pump is in service and the 3B RBCCW pump will be tagged out later this shift for an oil change.

Event No.	Malfunction Number	Event Type*	Event Description
1	N/A	R-ATC R-SRO	Lowers Reactor Power to <95% IAW 3-GOI-100-12
2	N/A	N-BOP	Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).
3	EG13A	C-BOP	Bus Duct Cooling Fan 3A trip
4	SW02A	C-ATC TS-SRO	RBCCW 3A Pump trip and failure of sectionalizing valve to auto-close
5	ED10B	C-BOP TS-SRO	Loss of 480V S/D Board 3B
6	MC04	C-BOP C-SRO	Loss of Condenser Vacuum
7	ED01	M-ALL	Loss of Offsite Power
8	DG01A	C-BOP	DG 3EA Fails to Auto start
9	TH21	M-All	LOCA
10	HP04	C-BOP	HPCI Steam Supply Valve fails to auto open.

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

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## Events

1. ATC will lower reactor power to <95% at the direction of the SRO. Once power is approximately 95% the scenario may continue.
2. BOP will conduct Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9). When 3-SR-3.3.1.1.8(9) is completed or at the direction of the lead examiner the scenario may continue.
3. Bus Duct Cooling Fan 3A will trip and annunciator 3-XA-55-7A window 31, GEN BUS DUCT FAN FAILURE, will be received. The BOP operator will place the 3B Bus Duct Cooling Fan in service. When the 3B Bus Duct Cooling Fan is in service the scenario may continue.
4. The crew will respond to a trip of RBCCW Pump 3A IAW 3-AOI-70-1, The spare RBCCW pump is aligned and will be the only one running until the crew places RBCCW Pump 3B in service. The RBCCW sectionalizing valve will fail to auto close on the trip of RBCCW Pump 3A, the ATC will close the sectionalizing valve. The SRO will evaluate TRM 3.4.1 and take actions for failure to meet surveillance requirement TSR 3.4.1.1. When the Tech Spec call is completed and the lead examiner is ready the scenario may continue.
5. The crew will respond to a loss of 480V Shutdown Board 3B. This will cause a loss of RPS B, loss of 480V RMOV BD 3B, 3C and 3E. The crew will need to restore power to the 480V RMOV Boards, reset RPS, reset PCIS and restore systems. The SRO will refer to Technical Specification 3.4.5 and determine conditions A, B, and D are required for inoperable containment atmospheric and drywell Floor Drain sump monitoring equipment. Loss of the Shutdown Board will result in entry into Tech Spec 3.8.7 condition B to restore the board in 8 hours and 3.8.7 condition C to declare the affected RHR subsystem (RHR Loop II) inoperable immediately. This will also require entry into Tech Spec 3.8.7.G for U1 and U2 due to the loss of power to CREV B. When power has been restored to the RMOV boards and the Tech Spec call is complete or as directed by the Lead Examiner the scenario may continue.
6. Condenser Vacuum will begin to degrade the SRO will initially enter 3-AOI-47-3 and direct reducing reactor power in an attempt to maintain condenser vacuum. Condenser Vacuum will continue to degrade. The SRO will set a trigger value to trip the main turbine and scram the reactor before an automatic turbine trip occurs at approximately 24.3 inched Hg.
7. After the Reactor Scram on vacuum a Loss of Offsite Power will occur. The crew will respond to the Reactor Scram IAW 3-AOI-100-1 and 0-AOI-57-1A.
8. During the LOOP DG 3EA will fail to automatically start and will have to be manually started and after it starts auto tie to the buss.
9. Sometime after the LOOP a LOCA will develop requiring the crew to utilize systems to maintain Reactor Level and Containment parameters.
10. The HPCI Steam Supply Valve, 3-FCV-73-16, will fail to OPEN on an automatic HPCI initiation signal.

The scenario ends when Drywell Sprays have been initiated and Reactor Level is maintained above TAF (- 162 inches) or upon request of Lead Examiner.

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**Critical Tasks 3****1. RPV Level maintained above TAF (-162 inches)**

1. Safety Significance:  
Maintaining adequate core cooling
2. Cues:  
RPV level indication
3. Measured by:  
Reactor level indication above -162 inches
4. Feedback:  
RPV level trend  
HPCI/RCIC injection valve open indication

**2. When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and prior to exceeding the PSP limit.**

1. Safety Significance:  
Precludes failure of containment
2. Cues:  
Procedural compliance  
High Drywell Pressure and Suppression Chamber Pressure
3. Measured by:  
Observation - US directs Drywell Sprays IAW with EOI Appendix 17B  
**AND**  
Observation - RO initiates Drywell Sprays
4. Feedback:  
Drywell and Suppression Pressure lowering  
RHR flow to containment

**OR**

**2. Before Drywell temperature rises to 280°F, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve.**

1. Safety Significance:  
Precludes failure of containment
2. Cues:  
Procedural compliance  
High Drywell Pressure and Suppression Chamber Pressure
3. Measured by:  
Observation - US directs Drywell Sprays IAW with EOI Appendix 17B  
**AND**  
Observation - RO initiates Drywell Sprays

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4. Feedback:  
Drywell and Suppression Pressure lowering  
RHR flow to containment

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