Facility: Hatch Date of Examination: 8/12/2019

Item	Task Description	Initials a	Initials b*	Initials c**
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model in accordance with ES-401 or ES-401N.	PGC	N/A	BC
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 or ES-401N and whether all K/A categories are appropriately sampled.	PGC		BC
	c. Assess whether the outline overemphasizes any systems, evolutions, or generic topics.	PGC		BC
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	PGC		BC
2. SIMULATOR	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.	NA		N-1
	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) conforms with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D and in Section D.5, "Specific Instructions for the 'Simulator Operating Test,'" of ES-301 (including overlap).			
3. WALKTHROUGH	a. Verify that the systems walkthrough outline meets the criteria specified on Form ES-301-2: (1) The outline(s) contains 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 applicant's 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 radiologically controlled area tasks meets the criteria on the form.			
	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 whether 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. GENERAL	a. Assess whether plant-specific priorities (including probabilistic risk assessment and individual plant examination insights) are covered in the appropriate exam sections.			
	b. Assess whether the 10 CFR 55.41, 55.43, and 55.45 sampling is appropriate.			
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.			
	d. Check for duplication and overlap among exam sections and the last two NRC exams.			
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	✓	N/A	N-1

	Printed Name/Signature	Date
a. Author	Phillip G. Capehart / P G Capehart	7/31/2018
b. Facility Reviewer (*)	– N/A –	N/A
c. NRC's Chief Examiner (#)	BRUNO CABALLERO / B. Caballero	7-31-18
d. NRC Supervisor	Eugene Guthrie / E Guthrie	7/31/18

N-1: This Form ES-201-2 only for written exam outline

* Not applicable for NRC-prepared examination outlines.

The independent NRC reviewer initials items in column "c"; the chief examiner's concurrence is required.

Facility: HATCH Date of Exam: August 2019

Tier	Group	RO K/A Category Points												SRO-Only Points		
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total
1. Emergency and Abnormal Plant Evolutions	1	4	3	4	N/A			3	3	N/A		3	20	4	3	7
	2	1	1	2				1	1			1	7	2	1	3
	Tier Totals	5	4	6				4	4			4	27	6	4	10
2. Plant Systems	1	3	1	3	2	3	3	2	3	2	2	2	26	3	2	5
	2	1	1	1	1	2	1	1	1	1	1	1	12	Ø 2	1	3
	Tier Totals	4	2	4	3	5	4	3	4	3	3	3	38	5	3	8

3. Generic Knowledge and Abilities Categories	1	2	3	4	Total	1	2	3	4	Total
	2	3	3	2	10	2	2	2	1	7

Note:
1. BK Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it is replaced by a K/A from another Tier 3 category.)
2. BK The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points, and the SRO-only exam must total 25 points.
3. BK Systems/evolutions within each group are identified on the outline. Systems or evolutions that do not apply at the facility should be deleted with justification. 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. BK 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. BK Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. BK Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. BK 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. BK On the following pages, enter the K/A numbers, a brief description of each topic, the topics' 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 a category 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. BK 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.

G* Generic K/As

* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.

** These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

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	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
295001 (APE 1) Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	R						R - AK1.03		
295003 (APE 3) Partial or Complete Loss of AC Power / 6						R S	R - G2.2.39 S - G2.1.20		
295004 (APE 4) Partial or Total Loss of DC Power / 6			R				R - AK3.02		
295005 (APE 5) Main Turbine Generator Trip / 3				R			R - AA1.05		
295006 (APE 6) Scram / 1					R		R - AA2.02		
295016 (APE 16) Control Room Abandonment / 7		R					R - AK2.01		
295018 (APE 18) Partial or Complete Loss of CCW / 8			R		S		R - AK3.02 S - AA2.02		
295019 (APE 19) Partial or Complete Loss of Instrument Air / 8				R	S		R - AA1.04 S - AA2.02		
295021 (APE 21) Loss of Shutdown Cooling / 4			R		S		R - AK3.03 S - AA2.02		
295023 (APE 23) Refueling Accidents / 8					R		R - AA2.04		
295024 High Drywell Pressure / 5						R	R - G2.1.30		
295025 (EPE 2) High Reactor Pressure / 3		R				S	R - EK2.09 S - G2.2.37		
295026 (EPE 3) Suppression Pool High Water Temperature / 5	R						R - EK1.02		
~~295027 (EPE 4) High Containment~~ Temperature (Mark III Containment Only) / 5							N/A		
295028 (EPE 5) High Drywell Temperature (Mark I and Mark II only) / 5	R						R - EK1.02		
295030 (EPE 7) Low Suppression Pool Water Level / 5	R						R - EK1.02		
295031 (EPE 8) Reactor Low Water Level / 2						R S	R - G2.1.20 S - G2.2.44		
295037 (EPE 14) Scram Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			R				R - EK3.05		
295038 (EPE 15) High Offsite Radioactivity Release Rate / 9					R S		R - EA2.03 S - EA2.02		
600000 (APE 24) Plant Fire On Site / 8		R					R - AK2.04		
700000 (APE 25) Generator Voltage and Electric Grid Disturbances / 6				R			R - AA1.04		
K/A Category Totals: RO	4	3	4	3	3	3	Group Point Total:		20/7
SRO					4	3			

RO

T1G1 BWR EXAMINATION OUTLINE

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295001AK1.03	Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	3.6	4.1	✔											Thermal limits.......................................
295003G2.2.39	Partial or Complete Loss of AC / 6	3.9	4.5											✔	Knowledge of less than one hour technical specification action statements for systems.
295004AK3.02	Partial or Total Loss of DC Pwr / 6	2.9	3.3			✔									Ground isolation/fault determination.................
295006AA2.02	SCRAM / 1	4.3	4.4								✔				Control rod position.................................
295016AK2.01	Control Room Abandonment / 7	4.4	4.5		✔										Remote shutdown panel: Plant-Specific................
295018AK3.02	Partial or Total Loss of CCW / 8	3.3	3.4			✔									Reactor power reduction..............................
295019AA1.04	Partial or Total Loss of Inst. Air / 8	3.3	3.2							✔					Service air isolations valves: Plant-Specific........
295021AK3.03	Loss of Shutdown Cooling / 4	2.9	2.9			✔									Increasing drywell cooling...........................
295023AA2.04	Refueling Acc ~~Cooling Mode~~ / 8	3.4	4.1								✔				Occurrence of fuel handling accident.................
295024G2.1.30	High Drywell Pressure / 5	4.4	4.0											✔	Ability to locate and operate components, including local controls.
295025EK2.09	High Reactor Pressure / 3	3.9	3.9		✔										Reactor power..

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295026EK1.02	Suppression Pool High Water Temp. / 5	3.5	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Steam condensation...................................
295028EK1.02	High Drywell Temperature / 5	2.9	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Equipment environmental qualification.................
295030EK1.02	Low Suppression Pool Wtr Lvl / 5	3.5	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Pump NPSH..
295031G2.1.20	Reactor Low Water Level / 2	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
295037EK3.05	SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	3.2	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Cold shutdown boron weight: Plant-Specific...........
600000AK2.04	Plant Fire On Site / 8	2.5	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Breakers / relays / and disconnects
700000AA1.04	Generator Voltage and Electric Grid Distrurbancecs	4.1	4.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Reactor controls
295005AA1.05	Main Turbine Generator Trip / 3	3.6	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Reactor/turbine pressure regulating system...........
295038EA2.03	High Off-site Release Rate / 9	3.5	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Radiation levels.......................................

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295003G2.1.20	Partial or Complete Loss of AC / 6	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
295018AA2.02	Partial or Total Loss of CCW / 8	3.1	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Cooling water temperature............................
295019AA2.02	Partial or Total Loss of Inst. Air / 8	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Status of safety-related instrument air system loads (see AK2.1 - AK2.19)................................
295021AA2.02	Loss of Shutdown Cooling / 4	3.4	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	RHR/shutdown cooling system flow ....
295025G2.2.37	High Reactor Pressure / 3	3.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine operability and/or availability of safety related equipment
295031G2.2.44	Reactor Low Water Level / 2	4.2	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	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
295038EA2.02	High Off-site Release Rate / 9	2.5	3.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Total number of curies released........................

ES-401 BWR Examination Outline Form ES-401-1
Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
295002 (APE 2) Loss of Main Condenser Vacuum / 3					S		S-AA2.04		
295007 (APE 7) High Reactor Pressure / 3	R						R-AK1.03		
295008 (APE 8) High Reactor Water Level / 2			R				R-AK3.07		
295009 (APE 9) Low Reactor Water Level / 2									
295010 (APE 10) High Drywell Pressure / 5						R	R-G2.2.22		
295011 (APE 11) High Containment Temperature (Mark III Containment only) / 5									
295012 (APE 12) High Drywell Temperature / 5					S		S-AA2.01		
295013 (APE 13) High Suppression Pool Temperature. / 5									
295014 (APE 14) Inadvertent Reactivity Addition / 1				R			R-AA1.07		
295015 (APE 15) Incomplete Scram / 1									
295017 (APE 17) Abnormal Offsite Release Rate / 9			R				R-AK3.01		
295020 (APE 20) Inadvertent Containment Isolation / 5 & 7					R		R-AA2.06		
295022 (APE 22) Loss of Control Rod Drive Pumps / 1									
295029 (EPE 6) High Suppression Pool Water Level / 5									
295032 (EPE 9) High Secondary Containment Area Temperature / 5									
295033 (EPE 10) High Secondary Containment Area Radiation Levels / 9						S	S-G2.4.31		
295034 (EPE 11) Secondary Containment Ventilation High Radiation / 9									
295035 (EPE 12) Secondary Containment High Differential Pressure / 5									
295036 (EPE 13) Secondary Containment High Sump/Area Water Level / 5									
500000 (EPE 16) High Containment Hydrogen Concentration / 5		R					R-EK2.07		
K/A Category Point Totals: RO	1	1	2	1	1	1	Group Point Total:		7/3
SRO					2	1			

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295007AK1.03	High Reactor Pressure / 3	3.8	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Pressure effects on reactor power....................
295008AK3.07	High Reactor Water Level / 2	3.2	3.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	HPCS isolation: Plant-Specific......................
295010G2.2.22	High Drywell Pressure / 5	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.
295014AA1.07	Inadvertent Reactivity Addition / 1	4.0	4.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Cold water injection................................
295017AK3.01	High Off-site Release Rate / 9	3.6	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	System isolations..................................
295020AA2.06	Inadvertent Cont. Isolation / 5 & 7	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Cause of isolation..................................
500000EK2.07	High CTMT Hydrogen Conc. / 5	3.2	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Drywell vent system

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
295002AA2.04	Loss of Main Condenser Vac / 3	2.8	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Offgas system flow..................................
295012AA2.01	High Drywell Temperature / 5	3.8	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Drywell temperature..................................
295033G2.4.31	High Secondary Containment Area Radiation Levels / 9	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of annunciators alarms, indications or response procedures

ES-401 BWR Examination Outline Form ES-401-1
Plant Systems—Tier 2/Group 1 (RO/SRO)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
203000 (SF2, SF4 RHR/LPCI) RHR/LPCI: Injection Mode	R											R- K1.02		
205000 (SF4 SCS) Shutdown Cooling							R	R				R- A1.06, A2.11		
206000 (SF2, SF4 HPCIS) High-Pressure Coolant Injection				R								R- K4.06		
207000 (SF4 IC) Isolation (Emergency) Condenser												N/A		
209001 (SF2, SF4 LPCS) Low-Pressure Core Spray						R						R-K6.01		
209002 (SF2, SF4 HPCS) High-Pressure Core Spray												N/A		
211000 (SF1 SLCS) Standby Liquid Control				R							S	R-K4.07 S-G2.2.12		
212000 (SF7 RPS) Reactor Protection									R			R- A3.01		
215003 (SF7 IRM) Intermediate-Range Monitor			R								S	R- K3.01 S- G2.1.23		
215004 (SF7 SRMS) Source-Range Monitor							R					R- A1.01		
215005 (SF7 PRMS) Average Power Range Monitor/Local Power Range Monitor									R			R- A3.02		
217000 (SF2, SF4 RCIC) Reactor Core Isolation Cooling		R										R- K2.04		
218000 (SF3 ADS) Automatic Depressurization			R			R						R-K3.02, K6.05		
223002 (SF5 PCIS) Primary Containment Isolation/Nuclear Steam Supply Shutoff	R R											R- K1.15, K1.19		
239002 (SF3 SRV) Safety Relief Valves										R		R- A4.05		
259002 (SF2 RWLCS) Reactor Water Level Control					R							R- K5.08		
261000 (SF9 SGTS) Standby Gas Treatment								S			R	R- G2.4.50 S- A2.15		
262001 (SF6 AC) AC Electrical Distribution								R				R- A2.01		
262002 (SF6 UPS) Uninterruptable Power Supply (AC/DC)										R		R- A4.01		
263000 (SF6 DC) DC Electrical Distribution								R				R- A2.02		
264000 (SF6 EGE) Emergency Generators (Diesel/Jet) EDG						R		S			R	R- G2.2.12, K6.03 S- A2.10		
300000 (SF8 IA) Instrument Air					RR							R- K5.01, K5.13		
400000 (SF8 CCS) Component Cooling Water			R					S				R- K3.01 S- A2.03		
510000 (SF4 SWS*) Service Water (Normal and Emergency)														
K/A Category Point Totals: RO	3	1	3	2	3	3	2	3	2	2	2	Group Point Total:		26/5

SRO 3 2

RO

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
203000K1.02	RHR/LPCI: Injection Mode	3.9	3.9	✔											Suppression pool
205000A1.06	Shutdown Cooling	3.7	3.7							✔					Reactor temperatures (moderator, vessel, flange)
205000A2.11	Shutdown Cooling	2.5	2.7								✔				Recirculation pump trips: Plant-Specific
206000K4.06	HPCI	3.2	3.4				✔								Preventing water hammer in pump discharge line (procedural control): BWR-2, 3, 4
209001K6.01	LPCS	3.4	3.4						✔						A.C. power
211000K4.07	SLC	3.8	3.9				✔								RWCU isolation
212000A3.01	RPS	4.4	4.4									✔			Reactor Power
215003K3.01	IRM	3.9	4.0			✔									RPS
215004A1.01	Source Range Monitor	3.0	3.1							✔					Detector position
215005A3.02	APRM / LPRM	3.5	3.5									✔			Full core display
217000K2.04	RCIC	2.6	2.6		✔										Gland seal compressor (vacuum pump)

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
218000K3.02	ADS	4.5	4.6			✓									Ability to rapidly depressurize the reactor
218000K6.05	ADS	3.0	3.1						✓						A.C. power: Plant-Specific
223002K1.15	PCIS/Nuclear Steam Supply Shutoff	3.4	3.4	✓											High pressure core spray: Plant-Specific
223002K1.19	PCIS/Nuclear Steam Supply Shutoff	2.7	2.9	✓											Component cooling water systems
239002A4.05	SRVs	4.3	4.3										✓		Reactor pressure
259002K5.08	Reactor Water Level Control	3.6	3.8					✓							Heat removal mechanisms: FWCI
261000G2.4.50	SGTS	4.2	4.0											✓	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.
262001A2.01	AC Electrical Distribution	3.4	3.6								✓				Turbine/generator trip
262002A4.01	UPS (AC/DC)	2.8	3.1										✓		Transfer from alternative source to preferred source
263000A2.02	DC Electrical Distribution	2.6	2.9								✓				Loss of ventilation during charging
264000G2.2.12	EDGs	3.7	4.1											✓	Knowledge of surveillance procedures.

RO

T2G1 BWR EXAMINATION OUTLINE

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
264000K6.03	EDGs	3.5	3.7	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Lube oil pumps
300000K5.01	Instrument Air	2.5	2.5	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Air compressors
300000K5.13	Instrument Air	2.9	2.9	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Filters
400000K3.01	Component Cooling Water	2.9	3.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Loads cooled by CCWS

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
211000G2.2.12	SLC	3.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of surveillance procedures.
215003G2.1.23	IRM	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform specific system and integrated plant procedures during all modes of plant operation.
261000A2.15	SGTS	3.0	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	High area radiation by refuel bridge: Plant-Specific.
264000A2.10	EDGs	3.9	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	LOCA
400000A2.03	Component Cooling Water	2.9	3.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	High/low CCW temperature

ES-401	BWR Examination Outline Plant Systems—Tier 2/Group 2 (RO/SRO)											Form ES-401-1		

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
201001 (SF1 CRDH) CRD Hydraulic		R										R-K2.05		
201002 (SF1 RMCS) Reactor Manual Control											R	R-G2.1.20		
201003 (SF1 CRDM) Control Rod and Drive Mechanism										R		R-A4.02		
201004 (SF7 RSCS) Rod Sequence Control														
201005 (SF1, SF7 RCIS) Rod Control and Information														
201006 (SF7 RWMS) Rod Worth Minimizer														
202001 (SF1, SF4 RS) Recirculation														
202002 (SF1 RSCTL) Recirculation Flow Control														
204000 (SF2 RWCU) Reactor Water Cleanup						R						R-K6.08		
214000 (SF7 RPIS) Rod Position Information											S	S-G2.1.28		
215001 (SF7 TIP) Traversing In-Core Probe														
215002 (SF7 RBMS) Rod Block Monitor							R					R-A1.01		
216000 (SF7 NBI) Nuclear Boiler Instrumentation								S				S-A2.06		
219000 (SF5 RHR SPC) RHR/LPCI: Torus/Suppression Pool Cooling Mode			R									R-K3.01		
223001 (SF5 PCS) Primary Containment and Auxiliaries														
226001 (SF5 RHR CSS) RHR/LPCI: Containment Spray Mode														
230000 (SF5 RHR SPS) RHR/LPCI: Torus/Suppression Pool Spray Mode														
233000 (SF9 FPCCU) Fuel Pool Cooling/Cleanup					R							R-K5.06		
234000 (SF8 FH) Fuel-Handling Equipment					R							R-K5.04		
239001 (SF3, SF4 MRSS) Main and Reheat Steam														
239003 (SF9 MSVLCS) Main Steam Isolation Valve Leakage Control														
241000 (SF3 RTPRS) Reactor/Turbine Pressure Regulating	R											R-K1.34		
245000 (SF4 MTGEN) Main Turbine Generator/Auxiliary														
256000 (SF2 CDS) Condensate														
259001 (SF2 FWS) Feedwater														
268000 (SF9 RW) Radwaste														
271000 (SF9 OG) Offgas														
272000 (SF7, SF9 RMS) Radiation Monitoring								S				S-A2.16		
286000 (SF8 FPS) Fire Protection									R			R-A3.03		
288000 (SF9 PVS) Plant Ventilation														
290001 (SF5 SC) Secondary Containment														
290003 (SF9 CRV) Control Room Ventilation								R				R-A2.01		
290002 (SF4 RVI) Reactor Vessel Internals				R								R-K4.01		
51001 (SF8 CWS*) Circulating Water														
K/A Category Point Totals: RO	1	1	1	1	2	1	1	1	1	1	1	Group Point Total:		12/3
SRO								2			1			

RO

T2G2 BWR EXAMINATION OUTLINE

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
201001K2.05	CRD Hydraulic	4.5	4.5	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Alternate rod insertion valve solenoids: Plant-Specific
201002G2.1.20	RMCS	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
201003A4.02	Control Rod and Drive Mechanism	3.5	3.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	CRD mechanism position: Plant-Specific
204000K6.08	RWCU	3.5	3.5	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	PCIS/NSSSS
215002A1.01	RBM	2.7	2.8	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Trip reference: BWR-3,4,5
219000K3.01	RHR/LPCI: Torus/Pool Cooling Mode	3.9	4.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Suppression pool temperature control
233000K5.06	Fuel Pool Cooling/Cleanup	2.5	2.7	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Maximum normal heat load
234000K5.04	Fuel Handling Equipment	2.6	3.1	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Spent fuel pool design
241000K1.34	Reactor/Turbine Pressure Regulator	2.8	3.3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	EGC system: Plant-Specific
286000A3.03	Fire Protection	3.3	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Actuation of fire detectors
290002K4.01	Reactor Vessel Internals	3.7	3.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	2/3 core coverage following a DBA LOCA

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
290003A2.01	Control Room HVAC	3.1	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Initiation/reconfiguration

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
214000G2.1.28	RPIS	4.1	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the purpose and function of major system components and controls.
216000A2.06	Nuclear Boiler Inst.	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of power supply
272000A2.16	Radiation Monitoring	2.7	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Instrument malfunctions

Facility: HATCH Date of Exam: August 2019

Category	K/A #	Topic	RO IR	RO #	SRO-only IR	SRO-only #
1. Conduct of Operations	2.1.6	Ability to manage control room during transients	3.8			
	2.1.19	Ability to use plant computer... status	3.9			
	2.1.					
	2.1.13	Knowledge of facility requirements... access			3.2	
	2.1.20	Ability to execute procedure steps			4.6	
	2.1.					
	Subtotal		2		2	
2. Equipment Control	2.2.2	Ability to manipulate console controls... levels.	4.6			
	2.2.3	(multi-unit) Knowledge...differences...units	3.8			
	2.2.17	Knowledge of process for managing maintenance...	2.6			
	2.2.					
	2.2.14	Knowledge of process for ...configuration..status			4.3	
	2.2.25	Knowledge of the bases in TS for ... limits.			4.2	
	Subtotal		3		2	
3. Radiation Control	2.3.4	Knowledge of rad exposure limits.... conditions	3.2			
	2.3.7	Ability to comply w/ RWP.... conditions	3.5			
	2.3.11	Ability to control radiation releases	3.8			
	2.3.					
	2.3.12	Knowledge of radiological safety ..... duties			3.7	
	2.3.15	Knowledge of radiation monitoring systems			3.1	
	Subtotal		3		2	
4. Emergency Procedures/Plan	2.4.2	Knowledge of system setpoints... EOP entry cond's.	4.5			
	2.4.13	Knowledge of crew roles..., EOP usage.	4.0			
	2.4.					
	2.4.29	Knowledge of the emergency plan			4.4	
	2.4.					
	2.4.					
	Subtotal		2		1	
Tier 3 Point Total			10	10	7	7

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.19	Conduct of operations	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
G2.1.6	Conduct of operations	3.8	4.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to manage the control room crew during plant transients.
G2.2.17	Equipment Control	2.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for managing maintenance activities during power operations.
G2.2.2	Equipment Control	4.6	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
G2.2.3	Equipment Control	3.8	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	(multi-unit license) Knowledge of the design, procedural and operational differences between units.
G2.3.11	Radiation Control	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to control radiation releases.
G2.3.4	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation exposure limits under normal and emergency conditions
G2.3.7	Radiation Control	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.13	Emergency Procedures/Plans	4.0	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of crew roles and responsibilities during EOP usage.
G2.4.2	Emergency Procedures/Plans	4.5	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.13	Conduct of operations	2.5	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of facility requirements for controlling vital / controlled access.
G2.1.20	Conduct of operations	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
G2.2.14	Equipment Control	3.9	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for controlling equipment configuration or status
G2.2.25	Equipment Control	3.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
G2.3.12	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety principles pertaining to licensed operator duties
G2.3.15	Radiation Control	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation monitoring systems
G2.4.29	Emergency Procedures/Plans	3.1	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency plan.

Facility: E. I. HATCH	Date of Examination: 8/12/2019
Examination Level: RO ☒ SRO ☐	Operating Test Number: 2019-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations **RO Admin 1**	D, R	Correct RWL for high Drywell temperatures (**G2.1.25**)
Conduct of Operations **RO Admin 2**	D, R	34SV-SUV-019-2, Surveillance Checks, which evaluates Torus temperatures (**G2.1.7**)
Equipment Control **RO Admin 3**	D, R	Review HPCI Pump Operability Surveillance (**G2.2.12**)
Emergency Plan **RO Admin 4**	M, R	Determine the Evacuation Route During an Emergency (**G2.4.39**)

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes and Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 (**3**) for ROs; ≤ 4 for SROs and RO retakes)
(N)ew or (M)odified from bank (≥ 1) (**1**)
(P)revious 2 exams (≤ 1, randomly selected)

Facility: E. I. HATCH

Date of Examination: 8/12/2019

Examination Level: RO ☐ SRO ☒

Operating Test Number: 2019-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations **SRO Admin 1**	D, R	TRM Evaluation Of Failed RWL Instruments (**G2.1.7**)
Conduct of Operations **SRO Admin 2**	M, R	Verify Fuel Movements (**G2.1.35**)
Equipment Control **SRO Admin 3**	M, R	Review a Required Action Sheet (RAS) for an inoperable Tech Spec component. (**G2.2.23**)
Radiation Control **SRO Admin 4**	N, R	Given an inoperable ODCM Effluent Radiation detector, determine the required actions. (**G2.3.11**)
Emergency Plan **SRO Admin 5**	D, R	Determine the Emergency Classification - Complete NMP-EP-141 Checklist 1 and NMP-EP-141. (**G2.4.41**)

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes and Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 (2) for SROs and RO retakes)
(N)ew or (M)odified from bank (≥ 1) (3)
(P)revious 2 exams (≤ 1, randomly selected)

Facility:	**Plant E.I. Hatch**	Date of Examination:	**8/12/2019**
Exam Level: RO ☒ SRO-I ☐ SRO-U ☐		Operating Test Number:	**2019-301**

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U

System/JPM Title	Type Code*	Safety Function
CR/SIM 1 – Unstick a Control Rod (Alternate Path for Drifting Out)	A, EN, N, S	SF-1 Reactivity Control 201003A2.02
CR/SIM 2 – With ED required, Terminate / Prevent Cond/FW	D, L, S	SF-2 Reactor Water Level Control 259001K4.05
CR/SIM 3 – ED Using Head Vents	L, D, S	SF-3 Reactor Pressure Control 295025G2.1.23
CR/SIM 4 – Open the MSIVs In An Emergency (Alternate Path for MSL Break)	A, EN, M, S	SF-4 Heat Removal From the Core 239001A4.01
CR/SIM 5 – Initiate Torus Sprays (Alternate Path for RHR Pump Overload)	A, M, L, S	SF-5 Containment Integrity 226001A4.03
CR/SIM 6 – Energize 600VAC 2D from Normal Supply	C, N	SF-6 Electrical 262001A4.01
CR/SIM 7 – Perform RC-1, Alternate Path	A, D, S	SF-7 Instrumentation 212000A4.01
CR/SIM 8 – Place Control Room HVAC Systems in the Purge Mode	C, EN, L, D	SF-9 Radioactivity Release 290003A4.01

In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U

PLANT 1 – Vent the Scram Air Header (Unit 2)	D, E, L, R	SF-1 Reactivity Control 212000A4.17
PLANT 2 – Emergency Generators / Locally close output breaker by flashing field & lowering Hz then raising to ~60Hz	A, D, E	SF-6 Electrical 26400A3.04
PLANT 3 – From Outside the Control Room during a Control Room Evacuation, Maximize CRD System Flow (Unit 1)	D, E, R	SF-2 Reactor Water Level Control 295016AA1.06

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and 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 (5) / 4–6 / 2–3
(C)ontrol room	0 (2) /
(D)irect from bank	≤ 9 (7) / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 (3) / ≥ 1 / ≥ 1
(EN)gineered safety feature	≥ 1 (3) / ≥ 1 / ≥ 1 (control room system)
(L)ow-Power/Shutdown	≥ 1 (5) / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 (4) / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 (0) / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 (2) / ≥ 1 / ≥ 1
(S)imulator	

Facility:	Plant E.I. Hatch	Date of Examination:	8/12/2019
Exam Level: RO ☐ SRO-I ☒ SRO-U ☐		Operating Test Number:	2019-301

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U

System/JPM Title	Type Code*	Safety Function
CR/SIM 1 – Unstick a Control Rod (Alternate Path for Drifting Out)	A, EN, N, S	SF-1 Reactivity Control 201003A2.02
CR/SIM 2 – With ED required, Terminate / Prevent Cond/FW	D, L, S	SF-2 Reactor Water Level Control 259001K4.05
CR/SIM 3 – ED Using Head Vents	L, D, S	SF-3 Reactor Pressure Control 295025G2.1.23
CR/SIM 4 – Open the MSIVs In An Emergency (Alternate Path for MSL Break)	A, EN, M, S	SF-4 Heat Removal From the Core 239001A4.01
CR/SIM 5 – Initiate Torus Sprays (Alternate Path for RHR Pump Overload)	A, M, L, S	SF-5 Containment Integrity 226001A4.03
CR/SIM 6 – Energize 600VAC 2D from Normal Supply	C, N	SF-6 Electrical 262001A4.01
CR/SIM 7 – Perform RC-1, Alternate Path	A, D, S	SF-7 Instrumentation 212000A4.01

In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U

System/JPM Title	Type Code*	Safety Function
PLANT 1 – Vent the Scram Air Header (Unit 2)	D, E, L, R	SF-1 Reactivity Control 212000A4.17
PLANT 2 – Emergency Generators / Locally close output breaker by flashing field & lowering Hz then raising to ~60Hz	A, D, E	SF-6 Electrical 26400A3.04
PLANT 3 – From Outside the Control Room during a Control Room Evacuation, Maximize CRD System Flow (Unit 1)	D, E, R	SF-2 Reactor Water Level Control 295016AA1.06

*	All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.
* Type Codes	Criteria for RO /SRO-I/SRO-U
(A)lternate path	4–6 / 4–6 (5) / 2–3
(C)ontrol room	0 / 0 (1) /
(D)irect from bank	≤ 9 / ≤ 8 (6) / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 (3) / ≥ 1
(EN)gineered safety feature	≥ 1 / ≥ 1 (2) / ≥ 1 (control room system)
(L)ow-Power/Shutdown	≥ 1 / ≥ 1 (4) / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 (4) / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 (0) / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 (2) / ≥ 1
(S)imulator	

Facility:	**Plant E.I. Hatch**	Date of Examination:	**8/12/2019**
Exam Level: RO ☐ SRO-I ☐ SRO-U ☒		Operating Test Number:	**2019-301**

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U

System/JPM Title	Type Code*	Safety Function
CR/SIM 2 – With ED required, Terminate / Prevent Cond/FW	D, L, S	SF-2 Reactor Water Level Control 259001K4.05
CR/SIM 4 – Open the MSIVs In An Emergency (Alternate Path for MSL Break)	A, EN, M, S	SF-4 Heat Removal From the Core 239001A4.01
CR/SIM 5 – Initiate Torus Sprays (Alternate Path for RHR Pump Overload)	A, M, L, S	SF-5 Containment Integrity 226001A4.03

In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U

System/JPM Title	Type Code*	Safety Function
PLANT 1 – Vent the Scram Air Header (Unit 2)	D, E, L, R	SF-1 Reactivity Control 212000A4.17
PLANT 2 – Emergency Generators / Locally close output breaker by flashing field & lowering Hz then raising to ~60Hz	A, D, E	SF-6 Electrical 26400A3.04

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

* Type Codes	Criteria for RO /SRO-I/SRO-U
(A)lternate path	4–6 / 4–6 / 2–3 (3)
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4 (3)
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1 (2)
(EN)gineered safety feature	≥ 1 / ≥ 1 / ≥ 1 (1) (control room system)
(L)ow-Power/Shutdown	≥ 1 / ≥ 1 / ≥ 1 (3)
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1 (2)
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (0) (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1 (1)
(S)imulator	

1. 201001K2.05 001/00101C11/90000.012/NEW/SYS-B/BOTH/201001K2.05/2/2/F/2/ABG/ARB

Which ONE of the choices below completes the following statement?

The power supply to the **Unit 2** Alternate Rod Insertion (ARI) solenoids is 125V DC CABINET __________ .

A. 2C, 2R25-S003

B.✔ 2D, 2R25-S004

C. 2E, 2R25-S005

D. 2F, 2R25-S006

1. 201001K2.05 001
Description:
ARI Solenoids on UNIT 2 are powered by **2R25-S004**, 125V DC Cabinet 2D
ARI Solenoids on UNIT 1 are powered by 1R25-S005, 125V DC Cabinet 1E

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the power supply to the ARI solenoid valves.

The "A"distractor is plausible since this is a DC cabinent supplied by the Division 1 DC Switchgear 2R22-S016.

"B" is Correct.

The "C" distractor is plausible since it would be correct if asking for the power supply equivalent on Unit 1.

The "D"distractor is plausible since this is a DC cabinent supplied by an Emergency Diesel Generator.

1. 201001K2.05 001

References provided to the applicant:

NONE

K/A:

201001 Control Rod Drive Hydraulic System

K2. Knowledge of electrical power supplies to the following: (CFR: 41.7)

K2.05 Alternate rod insertion valve solenoids: Plant-Specific 4.5* 4.5*

LESSON PLAN/OBJECTIVE

C11-CRD-00101, Control Rod Drive System, **Ver. 11.0**, LO 90000.012

Reference(s) used to develop this question:

LOAD LIST A-20153, **Rev. 2**

2. 201002G2.1.20 001/05401C11/90000.015/NEW/P-NORM/BOTH/201002G2.1.20/2/2/H/2/ABG/ARB

The **Unit 2** is operating at 90% RTP during a control rod exercise with the following condition:

- o Control rod 10-39 is to be inserted from position 48 to 46

Subsequently, when Control rod 10-39 is given a notch insert signal,
it double notches to position 44.

Based on the above conditions and IAW 34GO-OPS-065-0, Control Rod Movement,

Control rod 10-39 __________ be considered a mispositioned control rod event.

When control rod 10-39 is returned to position 48, a Coupling Check __________ REQUIRED.

A. will;
is

B. will;
is NOT

C.✓ will NOT;
is

D. will NOT;
is NOT

2. 201002G2.1.20 001

Description:

34GO-OPS-065-0, Control Rod Movement:

7.5 Control Rod Mispositioning Event

7.5.1 A mispositioned control rod is defined as a control rod that meets one of the following criteria:

A control rod found to be left in a position other than the intended position AND NOT identified/corrected before OR during the confirmations step of the rod motion instructions.

OR

A control rod moved more than **one notch beyond** its intended position

7.5.3 IF a control rod is moved either intentionally OR unintentionally to position 48, a coupling check will be performed as required by Tech. Spec. by SR 3.1.3.5.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine if the control rod response was a double notch vs. mispositioning event (interpret) and then the procedure step for performing a coupling check (execute).

The "A"distractor is plausible since it would be correct if the rod moved to position 42. The second part is plausible since it is correct.

The "B"distractor is plausible since it would be correct if the rod moved to position 42. The second part is plausible since a coupling check has already been performed once prior to declaring the rod operable or when maintenance has been performed on the rod.

"C" is Correct.

The "D"distractor is plausible since the first part is correct. The second part is plausible since a coupling check has already been performed once prior to declaring the rod operable or when maintenance has been performed on the rod.

2. 201002G2.1.20 001

References provided to the applicant:

NONE

K/A:

201002 Reactor Manual Control System

G2.1.20 Ability to interpret and execute procedure steps.
(CFR: 41.10 / 43.5 / 45.12) 4.6 4.6

LESSON PLAN/OBJECTIVE:

C11-RMCS-05401, Rx Manual Control , **Ver. 8.0**, LO 90000.010, LO 90000.015

Reference(s) used to develop this question:

34GO-OPS-065-0, Control Rod Movement, **Ver. 15.4**

3. 201003A4.02 001/00102C11/90000.001/BANK/SYS-I/BOTH/201003A4.02/2/2/F/2/ABG/ARB

A coupling check is being performed on Rod 38-27.

Which ONE of the choices below completes the following statements that will indicate rod 38-27 is UNCOUPLED?

Position indication on the Four-Rod display will __________ .

The Red Full-Out light will be __________ .

A. indicate 49;
illuminated

B. indicate 49;
extinguished

C. be blank;
illuminated

D. be blank;
extinguished

3. 201003A4.02 001

Description:

The Position Indicators transmit electrical signals to provide remote indication of control rod position and CRD temperature. The indicator probes consist of a plug, receptacle, thermocouple, and a switch support with 53 switches. The switches are magnetic reed switches and are normally open. They are closed (made-up) by the magnet on the bottom of the drive piston. Switch 49 provides Red "Full Out" indication on the full core display and is located at position "48”. Rod position will indicate "48". Switch 50 is 2 inches below Switch 49. This means that it is 2 inches below the point where the Control Rod should have backseated. The switch can only close if uncoupling of the control rod has occurred and will provide the Control Room operator with an annunciator. When in this condition the rod position will NOT indicate and the "Full Out" indication will NOT be lit.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine (monitor) the expected control room rod position indication during a control rod coupling check.

The "A" distractor is plausible if the applicant thinks that switch 49 will indicate position 49 just like switches 00 to 48 and the second if the applicant remembers that this switch normally illuminates the Red Full-Out light.

The "B" distractor is plausible if the applicant thinks that switch 49 will indicate position 49 just like switches 00 to 48 and the second part is correct.

The "C" distractor is plausible since the first part is correct and the second if the applicant remembers that this switch normally illuminates the Red Full-Out light.

"D" is Correct.

3. 201003A4.02 001

References provided to the applicant:

NONE

K/A:

201003 Control Rod and Drive Mechanism

A4. Ability to manually operate and/or monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.02 CRD mechanism position: Plant-Specific 3.5 3.5

LESSON PLAN/OBJECTIVE:

C11-CRDM-00102, Control Rod Drive Mechanism, **Ver. 7.1**, LO 90000.001

Reference(s) used to develop this question:
34GO-OPS-065-0, Control Rod Movement, **Ver. 15.3**

Hatch Bank 201003A4.02-001 used on HLT-06 2011 NRC EXAM

4. 203000K1.02 001/00701E11/H-OP-90000.014/BANK/SYS-I/BOTH/203000K1.02/2/1/H/3/ARB

Unit 2 is operating at 100% RTP with RHR "A" Loop in Suppression Pool Cooling Mode with a single pump operating at a flowrate of 7,700 gpm.

A LOCA inside Primary Containment subsequently occurs.

At 13:00, plant conditions are:

RWL	-75 inches
RPV pressure	20 psig
Drywell pressure	18 psig

Based on the above conditions and without any operator actions, which ONE of the choices below completes the following statement?

At 13:05, RHR Loop "A" is expected to be pumping ___________ .

A. approximately 7,700 gpm to the Reactor

B✓ greater than 11,500 gpm to the Reactor

C. approximately 7,700 gpm to the Suppression Pool

D. greater than 11,500 gpm to the Suppression Pool

4. 203000K1.02 001

Description:

Suppression Pool Cooling in operation at 7,700 gpm, requires one pump in operation. Single pump operation is limited to 7,700 gpm.

When the LOCA signal occurs the LPCI system will re-align for injection to the vessel and the SPC flowpath will isolate. Also, the other RHR pump in the loop starts. Two pump operation will provide approximately 17,000 gpm. The RPV pressure is low enough to provide for the valve manipulations and full flow to the vessel.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the cause/effect relationship of the Torus (Suppression Pool) aligned in Torus Cooling and a LPCI injection signal resulting in RHR flow & rate changing from Torus Cooling to LPCI injection.

The "A" disctractor is plausible since there are times when the standby RHR pump will not auto start from a LPCI signal (controlled from RSDP) and the applicant realizing the Torus Cooling valves will isolate.

The "B" is Correct.

The "C" distractor is plausible since if the override switches were in manual, (not closing Torus Cooling Valves) RHR flow will not change, therefore, the previous flow will be maintained.

The "D" distractor is plausible since if the override switches were in manual, (not closing Torus Cooling Valves) RHR flow will change due to the 2nd RHR pump in the loop starting and the F048A (Hx Byp) opening, therefore, the previous flow will go up to greater than 11,500 gpm to the Torus from 2 pump operation.

4. 203000K1.02 001

References provided to the applicant:

NONE

K/A:

203000 RHR/LPCI: Injection Mode (Plant Specific)

K1. Knowledge of the physical connections and/or cause/effect relationships between RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) and the following:
(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.02 Suppression pool 3.9 3.9

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-E11-RHR-00701, Residual Heat Removal System, **Ver. 11.1**,
LO H-OP-90000.014

References used to develop this question:

Bank question from HLT Database
34SO-E11-010-2, Residual Heat Removal System, **Ver. 43.0**

5. 204000K6.08 001/00301G31/90000.001/NEW/SYS-B/BOTH/204000K6.08/2/2/F/2/ABG/ARB

Unit 2 is operating at 100% RTP.

- o A loss of RPS Bus A occurs

Based on the above conditions,

The PCIS Group that will have an isolation valve to automatically change position is PCIS __________ .

A. Group 3

B. Group 4

C.✔ Group 5

D. Group 6

5. 204000K6.08 001

Description:

Loss of RPS A will result in PCIS V (RWCU) 2G31-F001, RWCU Inboard isolation valve going closed.

PCIS Group 1 MSIVs
PCIS Group 2
PCIS Group 3 HPCI
PCIS Group 4 RCIC
PCIS Group 5 RWCU
PCIS Group 6 RHR SDC

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant how does the PCIS Group V (RWCU) system respond to a PCIS logic power loss.

The "A" distractor is plausible since there are Group I & II valves that will change position and the applicant associating this Group III.

The "B" distractor is plausible since there are Group I & II valves that will change position and the applicant associating this Group IV.

"C" is Correct.

The "D" distractor is plausible since it would be correct except the Group VI valves are closed at this power level.

5. 204000K6.08 001

References provided to the applicant:

NONE

K/A:

204000 Reactor Water Cleanup System

K6. Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER CLEANUP SYSTEM : (CFR: 41.7 / 45.7)

K6.08 PCIS/NSSSS 3.5 3.5

LESSON PLAN/OBJECTIVE:

G31-RWCU-00301, Reactor Water Cleanup, **Ver. 7.1**, LO 90000.001

Reference(s) used to develop this question:

34AB-G31-001-2, RWCU ISOLATION, **Ver. 0.13**

6. 205000A1.06 001/00701E11/90000.015/MOD/P-NORM/BOTH/205000A1.06/2/1/H/2/ABG/ARB

Unit 2 has been shutdown for a refueling outage.

- o Reactor is in Mode 4
- o RHR loop B is in Shutdown Cooling
- o Power history 32 EFPY

At 12:00, the following conditions exist after RHR loop B flow adjustment:

- o RPV Head Flange Metal temperature is 108°F
- o RPV Head Flange Metal temperature is lowering 10°F every 30 minutes

Based on the above conditions and IAW the **Unit 2** Pressure and Temperature Limits Report,

The EARLIEST listed time that the RPV Head Flange temperature will be BELOW the MINIMUM RPV Metal temperature is __________ .

Reference Provided

A. 12:30

B✔ 13:00

C. 13:30

D. 14:00

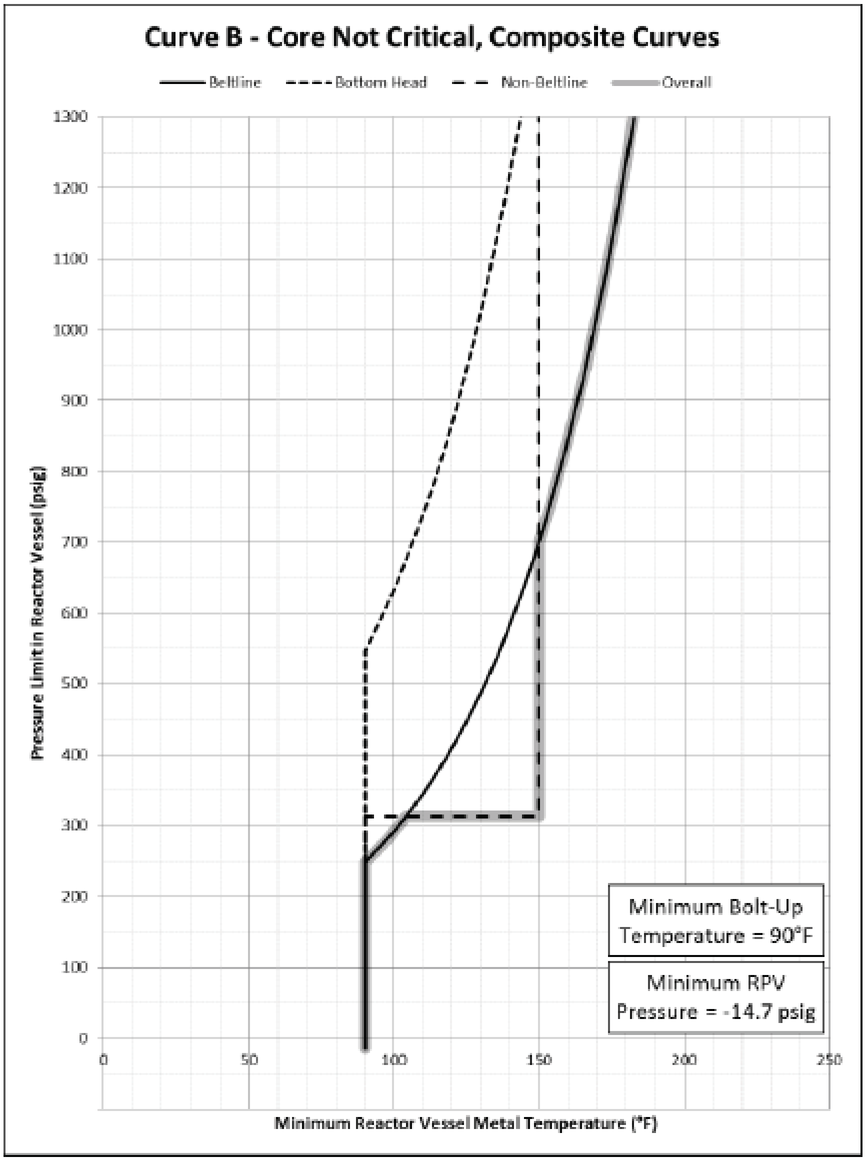
6. 205000A1.06 001

Description:

RPV Flange Temp is not below 90°F but will be within 20 minutes (1°F every 3 minutes) which will be a violation of Tech Spec 3.4.9 and **34GO-OPS-013-2**, Attachment 1, Cooldown / Depressurization Check limit (RPV is to the right of the curves in the PTLR)..

For **Unit Two**, Flange temperature is already below the 90F limit shown in Hatch Unit 2 PTLR.

Figure 2: HNP-2 P-T Curve B (Normal Operation – Core Not Critical) for 37 EFPY



K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to predict how vessel flange temperature will respond to a set of Shutdown Cooling conditions.

The "A" distractor is plausible since 100°F is the Unit 2 RCS temperature at which the reactor vessel flange and head flange temperatures are to be verified within PTLR limits.

"B" is Correct.

The "C" distractor is plausible since 86°F is the Unit 1 RCS temperature at which the reactor vessel flange and head flange temperatures are to be verified within PTLR limits.

The "D"distractor is plausible since 76°F would be the correct limit for Unit 1.

6. 205000A1.06 001

References provided to the applicant:

Unit1 & Unit 2 Pressure and Temperature Limits Report (PTLR)
PAGE 16 OF 40, U1 CURVE B
PAGE 16 OF 40, U2 CURVE B

K/A:

205000 Shutdown Cooling System (RHR Shutdown Cooling Mode)

A1. Ability to predict and/or monitor changes in parameters associated with operating the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) controls including: (CFR: 41.5 / 45.5)

A1.06 Reactor temperatures (moderator, vessel, flange) 3.7 3.7

LESSON PLAN/OBJECTIVE:

E11-RHR-00701, Residual Heat Removal System, **Ver. 11.1,** LO 90000.015

Reference(s) used to develop this question:
Hatch Bank LOCT question LR-LP-007007-007
34SO-E11-010-2, Residual Heat Removal System, **Ver. 42.11**
Unit 2 Tech Spec, LCO 3.4.9, RCS Pressure and Temperature Limits, **Amd. 221**
Unit 1/2 Tech Bases, LCO, RCS Pressure and Temperature Limits, **Rev. 83/94**

ORIGINAL QUESTION

Unit 2 has been shutdown for a refueling outage.

- o Reactor is in Mode 4
- o "B" loop of Shutdown Cooling is in service
- o "B" RHR system flow .... 6,150 gpm
- o Corrected RWL .... 55 inches
- o Power history .... 32 EFPY
- o RPV Head Flange Metal temp ..... 93°F
- o RPV Head Flange Metal temperature is going down 10°F every 30 minutes

Based on this information,

RHR "B" loop flow __________ need to be adjusted to prevent degradation of an RHR component; AND,

Of the times listed below, the earliest the limitations on the RPV Head Flange temperature will be exceeded is within __________ .

A.✓ does / 30 minutes

B. does / 1 hour

C. does NOT / 30 minutes

D. does NOT / 1 hour

7. 205000A2.11 001/00701E11/90000.015/MOD/SYS-I/BOTH/205000A2.11/2/1/H/2/ABG/ARB

Unit 2 is in Mode 4 with RHR Loop B in Shutdown cooling (SDC).

The following conditions exist:

o RWL	50 inches (2C32-R606A-C, Narrow Range RWL)
o Recirc pump 2A	In service
o RHR SDC flow	7000 gpm

Subsequently, Recirc pump 2A trips.

Based on the above conditions and IAW 34SO-E11-010-2, Residual Heat Removal System,

After Recirc pump 2A trips, __________ .

A. RWL is allowed to be lowered to 34 inches indicated on 2C32-R606A-C before core circulation becomes a concern

B. raising RWL to 55 inches indicated on 2C32-R606A-C will restore adequate core circulation

C. RHR SDC flow is allowed to be lowered to 6300 GPM before core circulation becomes a concern

D.✓ raising RHR SDC flow to 7800 gpm will re-establish adequate core circulation

7. 205000A2.11 001

Description:

34SO-E11-010-2

NOTES

During cold conditions (< 212° F), 2C32-R606A, 2C32 R606B and 2C32-R606C, Reactor Level Instruments, read approximately 15 inches higher than actual reactor water level.

CAUTIONS

- o DO NOT RAISE INDICATED REACTOR WATER LEVEL ABOVE 60 INCHES ON 2C32-R606A, 2C32-R606B, OR 2C32-R606C, IF 2B21-R605 AND 2C32 R655 ARE INOPERABLE.

- o TO ENSURE ADEQUATE CORE CIRCULATION, CORRECTED RPV WATER LEVEL MUST BE MAINTAINED AS FOLLOWS:
  - o > 53" WITH SDC FLOW < 7700 GPM

  OR
  - o > 33" WITH SDC FLOW > 7700 GPM

  OR
- o 33" WITH AT LEAST ONE RECIRC PUMP RUNNING AT MINIMUM SPEED.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to predict (predicting is implied with the answers) if adequate core circulation will exist following a trip of Recirc Pump 2A and what action IAW procedures will mitigate the event.

The "A" distractor is plausible since this would be correct if SDC flow were greater than 7700 gpm.

The "B"distractor is plausible since this would be correct if actual corrected RWL was raised to > 53 inches.

The "C"distractor is plausible since this would be correct if RWL were greater than 53 inches.

"D" is Correct.

7. 205000A2.11 001

References provided to the applicant:

NONE

K/A:

205000 Shutdown Cooling System (RHR Shutdown Cooling Mode)

A2. Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6)

A2.11 Recirculation pump trips: Plant-Specific 2.5 2.7

LESSON PLAN/OBJECTIVE:

E11-RHR-00701, Residual Heat Removal System, **Ver. 11.1,** LO 90000.015

Reference(s) used to develop this question:

34SO-E11-010-2, Residual Heat Removal System, **Ver. 42.11**
Modified from VERMONT YANKEE 2014 Q# RO 14

ORIGINAL QUESTION

During a refueling outage the following conditions exist:

- The reactor has been shutdown for 20 days.
- The moisture separator is installed.
- Reactor level 190 inches
- Reactor coolant temperature is 180 degrees F
- Shut down cooling flow is 4500 GPM

Under these conditions, thermal stratification:

A. Will occur.
Flow must be raised to 6700 GPM.

B. Will occur.

Reactor coolant temperature must be reduced to < 140 degrees F.

C.✓ Will not occur.
Flow may be lowered to 4100 GPM.

D. Will not occur.
RPV level may be lowered to 153 inches before stratification is a concern.

8. 206000K4.06 001/E4100501/90000.015/NEW/P-NORM/BOTH/206000K4.06/2/1/F/2/ABG/ARB

IAW 34SO-E41-001-2, High Pressure Coolant Injection System, which ONE of the choices below completes the following statements?

When Attachment 9, HPCI System Fill and Vent, is being performed, HPCI is required to be aligned to the __________ .

When Section 7.4.6, Swapping HPCI Suction Source, is performed to align the HPCI suction to the Torus, a compensatory action is required to monitor pump __________ once per shift.

A.✓ Condensate Storage Tank;
suction pressure

B. Condensate Storage Tank;
discharge pressure

C. Torus;
suction pressure

D. Torus:
discharge pressure

8. 206000K4.06 001

Description:

Bruno, this was a Pre-submittal RO question. Changes were incorporated based on your ES-401-9 comments.

34SO-E41-001, Precaution:

The presence of air or gas in the suction piping could cause pump binding or damage.
The presence of air or gas in the discharge piping could cause **water hammer**, which could lead to ruptured piping, relief valve lifting, and broken or damaged piping supports.

7.4.6 Swapping HPCI Suction Source

7.4.6.2.2.4 Initiate a compensatory action per 31GO-OPS-014-0, to monitor pump suction pressure, ensuring pressure is > 9 psig, at least once per shift.

7.4.7 Confirming HPCI **Discharge** Piping Full When Aligned For Torus Suction

7.4.7.1 Confirm a compensatory action has been initiated per 31GO-OPS-014-0 to monitor pump **suction pressure**, confirming pressure is > 9 psig, at least once per shift.

Attachment 9 Fill and Vent

Note

The HPCI System is constructed such that the suction AND discharge piping is below the CST Level AND the System is normally lined up (**to the CST**) to maintain the piping full. This subsection provides a method to fill AND vent the system after maintenance has been performed.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know that the system operating procedure addresses water hammer in the discharge piping and the procedure requirements for venting source and where to confirm discharge piping full.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since the procedure section 7.4.7, is titled "Confirming HPCI **Discharge** Piping Full When Aligned For Torus Suction", which directs suction pressure to be monitored.

The "C"distractor is plausible since the Torus suction path is the only suction source that we take credit for. The second part is plausible since it is correct.

The "D"distractor is plausible since the Torus suction path is the only suction source that we take credit for. The second part is plausible since the procedure section 7.4.7, is titled "Confirming

HPCI **Discharge** Piping Full When Aligned For Torus Suction", which directs suction pressure to be monitored.

8. 206000K4.06 001

References provided to the applicant:

NONE

<u>K/A:</u>

206000 High Pressure Coolant Injection System

K4. Knowledge of HIGH PRESSURE COOLANT INJECTION SYSTEM design feature(s) and/or interlocks which provide for the following: (CFR: 41.7)

K4.06 Preventing water hammer in pump discharge line (procedural control):
BWR-2, 3, 4 . . . . 3.2 3.4

<u>LESSON PLAN/OBJECTIVE:</u>

E41-HPCI-00501, High Pressure Coolant Injection, **Ver. 8.2**, LO

<u>Reference(s) used to develop this question:</u>

34SO-E41-001-2, High Pressure Coolant Injection System.**Ver. 30.2**
Unit 2 Tech Bases LCO 3.5.1, ECCS Operating, **Rev. 20**

9. 209001K6.01 001/00801E21/90000.014/BANK/SYS-I/BOTH/209001K6.01/2/1/H/3/ABG/ARB

Unit 2 has experienced a transient during which Core Spray received a valid auto start signal.

Subsequently, when RPV pressure reaches 440 psig, 600VAC bus 2D DE-ENERGIZES.

RPV pressure is lowering at a constant rate of 10 psig/minute.

Two (2) minutes after 600VAC bus 2D DE-ENERGIZES,

Core Spray loop A _________ be aligned for injection.

Core Spray loop B _________ be aligned for injection.

A. will;
will

B.✓ will;
will NOT

C. will NOT;
will

D. will NOT;
will NOT

9. 209001K6.01 001

Description:

Both CS pumps will auto start because of high drywell pressure or low RWL. When reactor pressure drops to 425 (449) psig the injection valves will auto open.

2E21-F005B is powered from 600VAC bus 2D.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine if CS will align for injection based on a loss of an essential 600 VAC bus.

The "A" distractor would be correct on Unit 1 since both valves would open before the power loss when RPV pressure <449 psig.

"B" is Correct.

The "C" distractor is plausible since it would be correct if asking 600VAC bus 2C was lost.

The "D" distractor is plausible since RPV pressure is still above the minimum TS value (390 psig) for when injection valves would open, therefore both loops would not be aligned for injection.

9. 209001K6.01 001

References provided to the applicant:

NONE

K/A:

209001 Low Pressure Core Spray System

K6. Knowledge of the effect that a loss or malfunction of the following will have on the LOW PRESSURE CORE SPRAY SYSTEM : (CFR: 41.7 / 45.7)

K6.01 A.C. power 3.4 3.4

LESSON PLAN/OBJECTIVE:

E21-CS-00801,Core Spray, **Ver. 8.0**, LO 90000.014

Reference(s) used to develop this question:

34SO-E21-001-1, Core Spray System, **Ver. 24.5**
34SO-E21-001-2, Core Spray System, **Ver. 25.11**
Bank question from HLT Database

10. 211000K4.07 001/01101C41/90000.014/BANK/SYS-B/BOTH/211000K4.07/2/1/H/2/ABG/ARB

Unit 2 experiences an ATWS condition.

RWL is 9 inches (lowest reached).

IAW 34SO-C41-003-2, Standby Liquid Control System, the OATC positions the SBLC Pump Selector Switch, on panel 2H11-P603, to pump A.

Based on the above conditions,

2G31-F001, RWCU INBOARD valve, will __________ .

2G31-F004, RWCU OUTBOARD valve, will __________ .

A. automatically close;
remain open

B. automatically close;
automatically close

C. remain open;
remain open

D.✓ remain open;
automatically close

10. 211000K4.07 001

Description:

34SO-G31-003-2

5.2 LIMITATIONS

5.2.1 2G31-F001 AND 2G31-F004, RWCU Inboard Isolation AND RWCU Outboard Isolation, close on the following signals:

5.2.1.1 Low Reactor water level, -35 inches.
5.2.1.2 High differential flow, 56 gpm for 42.5 sec.
5.2.1.3 High RWCU area ventilation differential temperature.

- o RWCU Pump Room 60°F (Annunciated at 50°F)
- o RWCU Hx Room 60°F (Annunciated at 50°F)
- o RWCU Phase Separator Room 60°F (Annunciated at 50°F)

5.2.1.4 High RWCU area ambient temperature.

- o RWCU Pump Room 140°F (Annunciated at 130°F)
- o RWCU Hx Room 140°F (Annunciated at 130°F)
- o RWCU Phase Separator Room 140°F (Annunciated at 130°F)

5.2.2 2G31-F004, RWCU Outboard Isolation, closes on the following signals:

- o **Actuation of SBLC**
- o Non-Regenerative Heat Exchanger outlet temperature 140°F.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know that positioning the SBLC Pump Selector Switch will only cause the 2G31-F004 valve to automatically isolate (interlock).

The "A"distractor is plausible since this is correct for a loss of RPS A.

The "B" distractor is plausible since it is correct for RWCU pump room high temp.

The "C" distractor is plausible since this would be correct when manually initiating Standby Liquid locally (neither valve automatically closes).

"D" is Correct.

10. 211000K4.07 001

References provided to the applicant:

NONE

K/A:

211000 Standby Liquid Control System

K4. Knowledge of STANDBY LIQUID CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following: (CFR: 41.7)

K4.07 RWCU isolation 3.8* 3.9*

LESSON PLAN/OBJECTIVE:

C41-01101-SBLC, Standby Liquid Control, **Ver. 8.0**, LO 90000.014

Reference(s) used to develop this question:

34SO-C41-003-2, Standby Liquid Control System, **Ver. 12.5**
34SO-G31-003-2, Reactor Water Cleanup, **Ver. 44.3**
34AB-T23-002-2, Small Pipe Break Inside Primary Conatinment, **Ver. 5.8**
Bank question from HLT Database

11. 212000A3.01 001/01001C71/010.019.A.02/MOD/SYS-B/BOTH/212000A3.01/2/1/H/2/ABG/ARB

Unit 2 is shutting down for a refueling outage.

The Reactor Mode switch is in RUN with the following indications:

o APRM A	12.5%
o APRM B	13.5%
o APRM C	12.0%
o APRM D	14.0%

Subsequently, the Reactor Mode switch is transferred to the START & HOT STBY position.

Based on the above conditions, which ONE of the choices below completes the following statement?

The TOTAL number of white Scram Group lights EXTINGUISHED is __________ , based on exceeding the setpoint on __________ one (1) APRM.

A. four (4);
ONLY

B. four (4);
MORE than

C. eight (8);
ONLY

D✓ eight (8);
MORE than

11. 212000A3.01 001

Description:

V. Control Features & Interlocks
G. RPS Scram Setpoints and their Bases
8. Neutron Monitoring System
a. Plant Setpoints:
APRM high-high (not in run); 13%
Tech spec limit < 20%

34AR-603-219-2 APRM UPSCALE set point 10%, Rod Block

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to monitor the automatic RPS response to a given value of reactor power following a Mode Switch position change.

The "A"distractor is plausible since this is the correct RPS response if asking for only one (1) IRM trip.

The "B"distractor is plausible since this is the correct RPS response if asking for a B & D IRM trip.

The "C"distractor is plausible since this would be correct if the shorting links were removed.

"D" is Correct.

11. 212000A3.01 001

References provided to the applicant:

NONE

K/A:

212000 Reactor Protection System

A3. Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including: (CFR: 41.7 / 45.7)

A3.01 Reactor Power 4.4* 4.4*

LESSON PLAN/OBJECTIVE:

C71-RPS-LP-01001,Reactor Protection System , **Ver. 9.3**, LO 010.019.A.02

Reference(s) used to develop this question:

Modified from HLT data base Q# LT-010019-002

ORIGINAL QUESTION

On **Unit 2**, the Reactor Mode switch is in RUN:

- o APRM A........11.0%
- o APRM B........13.5%
- o APRM C........12.0%
- o APRM D........14.0%

Based on these conditions, how would the Reactor Protection System (RPS) respond if the Reactor Mode switch is transferred to the START & HOT STBY position?

A. No RPS actuation.

B. Only a half-scram in the RPS A system.

C. Only a half-scram in the RPS B system.

D.✓ A full scram.

12. 215002A1.01 001/01203C51/H-OP-90000.014/MOD/SYS-B/BOTH/215002A1.01/2/2/H/2/ABG/ARB

Unit 2 is operating with a central control rod selected and the following indications:

- o APRM A 28.0%
- o APRM B 29.5%
- o APRM C 29.0%
- o APRM D 30.0%

Based on the above conditions,

Currently, the Rod Block Monitor (RBM) A __________ automatically bypassed.

If APRM A is bypassed, RBM A Reference Power value will be __________ .

A. is;
29.0%

B. is;
30.0%

C.✔ is NOT;
29.0%

D. is NOT;
30.0%

12. 215002A1.01 001

Description:

Both RBM instruments separately receive the STP value from each of the four APRM channels. Based on this value, the RBM instrument selects one of three different RBM Average Flux Upscale setpoints or automatically bypasses itself. Each RBM channel designates a hierarchy of normal and alternate APRM channels to use as their reference APRM channel. The alternate channels are used in hierarchical order when the preferred channels are not available. The primary reference APRM for RBM "A" is APRM "A" with first alternate as "C" APRM and the second alternate is "D" APRM. The primary reference APRM for RBM "B" is APRM "B" with first alternate as "D" APRM and the second alternate is "C" APRM.

	RBM Channel A APRM	RBM Channel B APRM
Primary Reference --	A	B
First Alternate --	C	D
Second Alternate --	D	C

The RBM channel automatically bypasses itself when the reference APRM STP value is below the RBM Low Power Setpoint. The Low Trip Setpoint is active when STP is between the RBM Low Power Setpoint and the Intermediate Power Setpoint, the intermediate Trip Setpoint is active when STP is between the Intermediate Power Setpoint and the High Power Setpoint, and the High Trip Setpoint is active when STP is above the High Power Setpoint. Seemingly contrary to their designations, the Low Trip Setpoint is a greater value than the Intermediate Trip Setpoint which, in turn, is a greater value than the High Trip Setpoint. This reflects the reduction of operating margin before an alarm is reached as the overall reactor power increases. The designation or name of the trip indicates the range of STP values over which the trip Setpoint is active. The RBM has a bypass switch which allows manually bypassing only one RBM at a time for maintenance, testing or when needed.

RBM Alarm Setpoints

- o Upscale High Alarm 105.5%
- o Upscale Int. Alarm 109.3%
- o Upscale Low Alarm 115.1%
- o Downscale Alarm 95.0%

RBM Power Setpoints

- o High Power Setpoint 82.0%
- o Int. Power Setpoint 62.0%
- o **Low Power Setpoint 27.0%**

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to predict the change in the trip reference APRM for RBM A when the APRM A is bypassed.

The "A"distractor is plausible since it is below the TS requirement, 29%, for the RBM to be operable. The second part is correct.

The "B"distractor is plausible since it is below the TS requirement, 29%, for the RBM to be operable. The second part is plausible since this would be correct for RBM B if APRM B was bypassed, and this is also plausible since it is RBM A second alternate reference APRM value.

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since this would be correct for RBM B if APRM B was bypassed, and this is also plausible since it is RBM A second alternate reference APRM value.

12. 215002A1.01 001

References provided to the applicant:

NONE

K/A:

215002 Rod Block Monitor System

A1. Ability to predict and/or monitor changes in parameters associated with operating the ROD BLOCK MONITOR SYSTEM controls including: (CFR: 41.5 / 45.5)

A1.01 Trip reference: BWR-3,4,5 . . . . 2.7 2.8

LESSON PLAN/OBJECTIVE:

C51-PRNM-LP-01203, Power Range Neutron Monitoring System, **Ver. 12.0**, LO 90000.014

Reference(s) used to develop this question:

34AR-603-202-2, RBM UPSCALE OR INOPERATIVE, **Ver. 4.0**

Modified from HLT Bank 215002K6.04-002

ORIGINAL QUESTION

Unit 2 is operating at 100% RTP when APRM A fails DOWNSCALE.

- o APRM A is placed in BYPASS

Based on the above conditions,

RBM A will automatically select __________ as the Reference APRM channel.

For the given power level, the current RBM UPSCALE setpoint is __________ .

A. APRM B;
105.5%

B.✓ APRM C;
105.5%

C. APRM B;
109.3%

D. APRM C;
109.3%

13. 215003K3.01 001/01001C71/300.008.A.02/MOD/SYS-I/BOTH/215003K3.01/2/1/H/2/ABG/ARB

Unit 1 is performing a reactor startup IAW 34GO-OPS-001-1, Plant Startup.

The **Unit 1** Reactor Mode switch is in the STARTUP position.

Subsequently, a malfunction results in the following,

- o IRM B fails UPSCALE
- o IRM E fails INOP

Based on the above conditions and NO operator actions,

Alarm, REACTOR AUTO SCRAM SYSTEM A TRIP, 603-117, will be __________ .

Alarm, REACTOR AUTO SCRAM SYSTEM B TRIP, 603-118, will be __________ .

A. EXTINGUISHED;
EXTINGUISHED

B. EXTINGUISHED;
ILLUMINATED

C. ILLUMINATED;
EXTINGUISHED

D.✓ ILLUMINATED;
ILLUMINATED

13. 215003K3.01 001

Description

V. Control Features & Interlocks
G. RPS Scram Setpoints and their Bases.
8. Neutron Monitoring System
a. Plant Setpoints:
o IRM high-high; 115/125 divisions of full scale

H. Equipment Failure Scrams
The Neutron Monitoring system inputs a scram signal whenever any of the IRM or APRM channels become INOP.

IRMs will provide a trip signal on 115/125 with 4 channels (A,C,E,G) communicating with RPS A (REACTOR AUTO SCRAM SYSTEM A TRIP, 603-117).

IRMs will provide a trip signal on INOP with 4 channels (B,D,F,H) communicating with RPS B (REACTOR AUTO SCRAM SYSTEM B TRIP, 603-118).

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to identify the effect of a malfunction in the IRM system (IRM B upscale and IRM E INOP) on each division of RPS.

The "A"distractor is plausible since this would be correct if the Reactor Mode switch was in the RUN position.

The "B" distractor is plausible since this would be correct if any of the following occurred; IRM D or IRM F or IRM H, failed INOP instead of IRM E.

The "C" distractor is plausible since this would be correct if any of the following occurred; IRM A or IRM C or IRM G, failed UPSCALE instead of IRM B.

"D" is Correct.

13. 215003K3.01 001

References provided to the applicant:

NONE

K/A:

215003 Intermediate Range Monitor (IRM) System

K3. Knowledge of the effect that a loss or malfunction of the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM will have on following: (CFR: 41.7 / 45.4)

K3.01 RPS 3.9 4.0

LESSON PLAN/OBJECTIVE:

C71-RPS-01001, Reactor Protection System, **Ver. 9.3**, LO 300.008.A.02

Reference(s) used to develop this question:

34AR-603-117, REACTOR AUTO SCRAM SYSTEM A TRIP, **Ver. 6.1**
34AR-603-118, REACTOR AUTO SCRAM SYSTEM B TRIP, **Ver. 6.1**

Modified from HLT Database Q# 212000K6.05-004

ORIGINAL QUESTION

Subsequently, the following occurs,

- o IRM B fails UPSCALE
- o IRM E fails INOP

With the above conditions and NO operator actions,

All four (4) RPS Scram Group A, white indicating lights on the P603 Panel will be __________ .

All four (4) RPS Scram Group B, white indicating lights on the P603 Panel will be __________ .

A.✓ EXTINGUISHED;

EXTINGUISHED

B. EXTINGUISHED;
ILLUMINATED

C. ILLUMINATED;
EXTINGUISHED

D. ILLUMINATED;
ILLUMINATED

14. 215004A1.01 001/C51-SRM-01201/H-OP-90000.014/MOD/SYS-I/BOTH/215004A1.01/2/1/H/3/ARB/ABG

Unit 2 is in the process of a Reactor Startup.

- o The Reactor Mode Switch is in START/HOT STBY
- o All SRM indicate between 220 and 240 cps
- o All IRM channels are on Range 1
- o SRM/IRM Drive Control "Power On" light is illuminated
- o The ONLY neutron detector button illuminated is "SRM A SELECT"

Subsequently, the "Drive Out" push button for SRM/IRM Drive Control is inadvertently depressed for 20 seconds and then released.

- o SRM A currently indicates 170 cps

Based on the above conditions,

A SRM Control Rod Block __________ occur AND the SRM A detector __________ continue to withdraw until fully withdrawn.

A. will NOT;
will NOT

B. will NOT;
will

C.✓ will;
will NOT

D. will;
will

14. 215004A1.01 001

Description:

The SRM drive mechanism positions the shuttle tube (containing SRM detector chamber) from fully inserted position (18 inches above core midplane) to fully withdrawn position (30 inches below the bottom of the active core). When inserting detectors, the IN pushbutton is not required to be held. Once depressed the insertion will seal in until the IN pushbutton is depressed a second time. Depressing the OUT pushbutton while the detectors are inserting will not cancel or stop the insertion. When withdrawing detectors, the OUT signal does not seal in, the OUT pushbutton must be continuously depressed.

Retract Permit Downscale:
Illuminated when the respective SRM is indicating less than 200 cps. If the SRM is indicating less than 200 cps and the detector is not driven full in, a rod block signal will be generated.

Drive Control

1) The POWER ON switch is a two position, On (lighted) and Off, pushbutton that provides power to the drive control circuit for all four SRMs and all eight IRMs.

2) The SRM A/B/C/D SELECT switch is used to select a particular detector for driving in or out. One or up to all SRMs and/or IRMs can be selected at a time. When a detector is selected, the select pushbutton will be illuminated.

3) The DRIVE IN pushbutton operates the mechanism to drive the selected detectors in. The DRIVE IN light will extinguish when the selected detectors reach full in. The Drive In signal is still sealed in. The DRIVE IN pushbutton must be depressed again to remove the signal, if detectors are to be withdrawn. If another detector is selected with the DRIVE IN pushbutton still depressed, the detector will start moving inward just as soon as the SELECT pushbutton is depressed.

4) The DRIVE OUT pushbutton operates the mechanism to drive selected detectors out. It is **NOT** a seal in pushbutton and must be held in the depressed position for continuous detector withdrawal.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to predict when the rod block will be received and when detector movement will cease based upon repositioning the detector.

The "A" distractor is plausible since the SRM Downscale setpoint is the next setpoint to initiate a Control Rod Block if SRM CPS were to continue to lower. The second part is plausible since it is correct.

The "B" distractor is plausible since the SRM Downscale setpoint is the next setpoint to initiate a Control Rod Block if SRM CPS were to continue to lower. The second part is plausible since there is a pushbutton that will drive the entire direction when depressed (Drive In).

"C" is correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since there is a pushbutton that will drive the entire direction when depressed (Drive In).

14. 215004A1.01 001

References provided to the applicant:

NONE

K/A:

215004 Source Range Monitor (SRM) System

A1. Ability to predict and/or monitor changes in parameters associated with operating the SOURCE RANGE MONITOR (SRM) SYSTEM controls including: (CFR: 41.5 / 45.5)

A1.01 Detector position 3.0 3.1

LESSON PLAN/OBJECTIVE:

C51-SRM-LP-01201, Source Range Monitors, **Ver. 8.1**, LO H-OP-90000.014

Reference(s) used to develop this question:

Modified from HLT Database Q#215003K4.05 001

ORIGINAL QUESTION

Unit 2 is in the process of a Reactor Startup.

o The Reactor Mode Switch is in Start/Hot Stby
o All IRM channels are on Range 6 indicating 50/125
o SRM/IRM Drive Control "Power On" light is illuminated
o The ONLY neutron detector button illuminated is "IRM A SELECT"

The "Drive Out" push button for SRM/IRM Drive Control is inadvertently depressed for 10 seconds and then released.

Based on the above conditions,

An IRM control rod block will __________ AND the detector will __________ .

A. NOT occur since the IRM detector is indicating between the downscale and upscale setpoints;
continue to withdraw until fully withdrawn

B. NOT occur since the IRM detector is indicating between the downscale and upscale setpoints;
stop moving as soon as the "Drive Out" push button is released

C. occur as soon as the detector "Not Full In" is sensed;
continue to withdraw until fully withdrawn

D.✓ occur as soon as the detector "Not Full In" is sensed;
stop moving as soon as the "Drive Out" push button is released

15. 215005A3.04 001/01203C51/90000.004/MOD SYS-B/BOTH/215005A3.04/2/1/H/2/ABG/ARB

Unit 1 is operating at 100% RTP with no rods selected.

Subsequently, one of the "A" level LPRM outputs on the LPRM BARGRAPHS located on panel 1H11-P603 lowers to 12%.

Based on the above conditions, which one of the choices below completes the following statements?

The APRM Reactor Power indication associated with the above LPRM will __________ .

Alarm, LPRM DOWNSCALE, 603-246, __________ be ILLUMINATED.

A. be lower;
will

B.✔ be lower;
will NOT

C. remain the same;
will

D. remain the same;
will NOT

15. 215005A3.04 001

Description:

Each APRM channel receives only the subset of LPRM data and Total Recirculation Flow data associated with that APRM channel. The LPRM detector assignments have been made so that the mathematical average of the individual LPRM detector signals is reasonably representative of the average flux in the reactor. Each APRM is assigned one of four LPRM detectors in each LPRM string (31 total) and the quantity of LPRM detectors for each level in the reactor is relatively equal for all levels for each APRM.

LPRM DOWNSCALE, 603-246, set point is 3% power.

The associated APRM Reactor power indication should lower since the "A" level LPRM is lower. APRMs use all of the LPRM levels assigned to them. This will cause the APRM to see a lower level of power coming from the failed LPRM, which in turn will cause the associated APRM to indicate a lower reactor power.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to monitor APRM indications and determine if the APRMs are correctly automatically responding to an abnormally low indication of a single "A" level LPRM and whether the LPRM DOWNSCALE, 603-246, set point has been exceeded.

The "A" distractor is plausible since the first part is correct. The second part is plausible since 20.6% is the RWM Low Power Setpoint.

"B" is Correct.

The "C" distractor is plausible since RBM does not use the "A" level LPRMs for power, therefore the "A" level LPRM failure will have NO effect on the associated indication. The second part is plausible since 20.6% is the RWM Low Power Setpoint.

The "D" distractor is plausible since RBM does not use the "A" level LPRMs for power, therefore the "A" level LPRM failure will have NO effect on the associated indication. The second part is correct.

15. 215005A3.04 001

References provided to the applicant:

NONE

K/A:

215005 Average Power Range Monitor/Local Power Range Monitor System

A3. Ability to monitor automatic operations of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM including:
(CFR: 41.7 / 45.7)

A3.04 Annunciator and alarm signals 3.2 3.2

IAW CHIEF EXAMINER BRUNO CABALLERO, THE BELOW K/A WAS REPLACED WITH THE ABOVE K/A ON 1/18/2019.

A3. Ability to monitor automatic operations of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM including:
(CFR: 41.7 / 45.7)

A3.02 Full core display 3.5 3.5

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-C51-PRNM-01203, Power Range Neutron Monitoring System, **Ver. 13.0**,
LO H-OP-90000.004

Reference(s) used to develop this question:

From HLT 3 NRC Q#14, 215005KK3.08-001

ORIGINAL QUESTION

Unit 2 is operating at 100% power with no rods selected and the following alarm is received:

o LPRM UPSCALE (603-237)

The operator confirms at panel 2H11-P603 that one LPRM is upscale as shown on the LPRM BARGRAPHS function.

Which ONE of the following describes how this will affect the core thermal limit calculations and the requirements for APRM operability?

A.✓ MFLPD and MAPRAT values will rise.
APRM operability requires a minimum of 3 LPRMs per level.

B. MFLPD and MAPRAT values will rise.
APRM operability requires a minimum of 2 LPRMs per level.

C. MFLPD and MAPRAT values will lower.
APRM operability requires a minimum of 3 LPRMs per level.

D. MFLPD and MAPRAT values will lower.
APRM operability requires a minimum of 2 LPRMs per level.

16. 217000K2.04 001/03901E51/90000.012/MOD/SYS-B/BOTH/217000K2.04/2/1/F/2/ABG/ARB

Which ONE of the choices below completes the following statement?

The power supply to the 2E51-C002-2, RCIC Barometric Condenser Vacuum Pump, is _________ .

A. 2R25-S001, 125V DC Distribution Cabinet 2A Control Building

B. 2R25-S002, 125V DC Distribution Cabinet 2B Control Building

C.✓ 2R24-S021, 250V DC MCC 2A Reactor Building Feeder

D. 2R24-S022, 250V DC MCC 2B Reactor Building Feeder

16. 217000K2.04 001

Description:

RCIC Barometric Condenser Vacuum pump (E51-C002-2) removes non-condensables from the Barometric Condenser and discharges them to the Torus. It will automatically start on RCIC system initiation. The Vacuum Pump maintains 10" Hg vacuum on the condenser and removes non-condensables. The pump is operated by a 3 hp DC motor which receives power from **250 VDC Panel R24-S021.** The RCIC Barometric Condenser Vacuum Pump is located on the Barometric Condenser.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to select the power supply for the RCIC Barometeric Condenser Vacuum Pump.

The "A"distractor is plausible since this is the power supply to the 2E51-F004, RCIC Barometeric Condenser pump INBD discharge valve to CRW.

The "B"distractor is plausible since this is the power supply to the 2E51-F005, RCIC Barometeric Condenser pump OUTBD discharge valve to CRW.

"C" is Correct.

The "D"distractor is plausible since this is the correct power supply for the HPCI Barometric Condenser Vacuum Pump, 2E41-C002-2.

16. 217000K2.04 001

References provided to the applicant:

NONE

K/A:

217000 Reactor Core Isolation Cooling System (RCIC)

K2. Knowledge of electrical power supplies to the following: (CFR: 41.7)

K2.04 Gland seal compressor (vacuum pump) 2.6* 2.6*

LESSON PLAN/OBJECTIVE:

E51-RCIC-LP-03901, Reactor Core Isolation Cooling (RCIC), **Ver. 9.0**, LO 90000.012

Reference(s) used to develop this question:

34SO-E51-001-2, Reactor Core Isolation Cooling, **Ver. 28.0**
HLT Database Q#217000K2.04-001 which was used on 2012 NRC Exam Q#19

ORIGINAL QUESTION

Which ONE of the choices below is the power supply to RCIC Barometric Condenser Vacuum Pump, 2E51-C002-2?

A. 125/250V DC SWGR 2C, 2R22-S018

B. 125/250V DC SWGR 2D, 2R22-S019

C.✓ 250V DC MCC 2A, Reactor Building Feeder, 2R24-S021

D. 250V DC MCC 2B, Reactor Building Feeder, 2R24-S022

17. 218000K3.02 001/03801B21/H-OP-90000.001/NEW/ SYS-I/BOTH/218000K3.02/2/1/F/3/ABG/ARB

Unit 2 was operating at 100% RTP when an event resulted in the following:

- o 2R25-S001, 125VDC Bus 2A, DE-ENERGIZES
- o ADS Inhibit Switches are in the "NORMAL" position

Based on the above event,

The TOTAL number of ADS valves that will be AVAILABLE to AUTOMATICALLY OPEN is __________ .

A✓ seven (7)

B. five (5)

C. two (2)

D. zero (0)

17. 218000K3.02 001

Description:

The control logic is powered from the station service batteries through 2R25-S001 (125VDC bus 2A) and 2R25-S002 (125VDC bus 2B). The "A" and "B" logic is normally powered from the 125VDC 2A bus. The "B" logic is alternately powered from 125VDC 2B bus upon failure of the 2A bus. There is no provision for alternate power to the "A" logic. Both Logic Channels have contacts in all of the SRV control circuits. If one channel fails the other will still open the seven (7) SRVs on an ADS initiation.

SRVs assigned to ADS on U2 are "A", "C", "E", "H", "K", "L", &"M" for a total of 7 SRVs.
SRVs assigned to LLS on U2 are "B", "G", "F", & "D" for a total of 4 SRVs.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know how a malfunction in the power supply logic control circuit for ADS valves will effect the ability to rapidly depressurize the RPV.

"A" is Correct.

The "B" distractor is plausible since this is the minimum number of SRVs required for an emergency depress and the minimum number of ADS valves that will receive backup pneumatic supply (nitrogen), therefore, the applicant knowing this value & backup pneumatic supply.

The "C" distractor is plausible since this is the total number of LLS SRVs that will open if the LLS logic is actuated.

The "D" distractor is plausible since both ADS logic trains input into each other and with a power failure to components in both logic trains, not allowing any ADS SRVs to open.

17. 218000K3.02 001

References provided to the applicant:

NONE

K/A:

218000 Automatic Depressurization System

K3. Knowledge of the effect that a loss or malfunction of the AUTOMATIC DEPRESSURIZATION SYSTEM will have on following: (CFR: 41.7 / 45.4)

K3.02 Ability to rapidly depressurize the reactor 4.5* 4.6*

LESSON PLAN/OBJECTIVE:

H-LT-LP-B21-ADS-03801, Automatic Depressurization System (ADS), **Ver. 6.0**,
EO H-OP-90000.001

Reference(s) used to develop this question:

34SO-B21-001-2, Automatic Depressurization (ADS) and Low-Low Set (LLS) Systems, **Ver. 13.15**

18. 218000K6.05 001/03801B21/038.004.A.02/MOD SYS-B/BOTH/218000K6.05/2/1/H/3/ABG/ARB

Unit 2 was operating at 100% RTP with the 2C RHR pump out of service (inop).

A loss of offsite power occurred on **Unit 2** and the following plant conditions currently exist at time t = 0:

o 4160 VAC buses 2E and 2G are DE-ENERGIZED
o Drywell pressure peaked at 1.5 psig and is slowly lowering
o Reactor water level is -120 inches and steady with RCIC.

Based on the above conditions, which ONE of the choices below completes the following statement?

The Automatic Depressurization System (ADS) will __________ .

A✓ initiate after approximately 12.7 minutes have elapsed.

B. initiate as soon as approximately 1.7 minutes have elapsed.

C. NOT initiate because no RHR pumps are running.

D. NOT initiate because no Core Spray pumps are running.

18. 218000K6.05 001

Description:

Power supplies
4160 VAC Bus 2E: CS 2A, RHR 2A, RHRSW 2A
4160 VAC Bus 2F: RHR 2C, RHR 2D, RHRSW 2C
4160 VAC Bus 2G: CS 2B, RHR 2B, RHRSW 2B, RHRSW 2D

Initiation of ADS without high Drywell pressure will occur if the following conditions exist simultaneously:

a. Low Reactor water level (Level 3) at +3.0".
b. Low Reactor water level (Level 1) at -101".
c. High Drywell Pressure Bypass Timer timed out - **11 minutes**
d. 102.5 second timer timed out. Without the high Drywell pressure signal, the **102.5** second timer will not initiate until the High Drywell Pressure Bypass Timer times out and 2.a and 2.b are present.
e. CS Pump discharge pressure of 152 psig OR RHR Pump discharge pressure of 127 psig.
f. Once the 102.5 second timer is timed out, if RHR OR CS Pump discharge pressure is available, all 7 ADS Valves open.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to the determine the effect of a loss of 4160 VAC 2E and 4160 VAC 2G Buses will have on the AUTOMATIC DEPRESSURIZATION SYSTEM.

"A" is Correct.

The "B" distractor is plausible since it would be true if drywell pressure were greater 1.85 psig.

The "C"distractor is plausible if the RHR pumps were powered in the same arrangment as the RHRSW pumps therefor no RHR pumps would be running.

The "D"distractor is plausible since this would be true because both CS pumps are de-energized and if the ADS initiation logic required both a RHR pump running (127 psig) and a CS pump running (152 psig) instead of either one.

18. 218000K6.05 001

References provided to the applicant:

NONE

K/A:

218000 Automatic Depressurization System

K6. Knowledge of the effect that a loss or malfunction of the following will have on the AUTOMATIC DEPRESSURIZATION SYSTEM : (CFR: 41.7 / 45.7)

K6.05 A.C. power: Plant-Specific 3.0* 3.1*

LESSON PLAN/OBJECTIVE:

B21-ADS-03801,Automatic Depressuization System (ADS) , **Ver. 6.0**, LO 038.004.A.02

Reference(s) used to develop this question:

34SO-B21-001-2, ADS And LLS Systems, **Ver. 13.15**

Modified from Hatch 2007 NRC Q#16

ORIGINAL QUESTION

Unit 2 was operating at 100% power with the 2B Core Spray pump out of service (inop).

A loss of offsite power occurred on Unit 2 and the following plant conditions currently exist at time t = 0:

o 4KV Emergency buses 2E and 2F are de-energized
o Drywell pressure is 1.5 psig and slowly decreasing
o Reactor water level is -120 inches and steady with RCIC.

Which ONE of the following describes how the automatic depressurization system (ADS) will be affected by these plant conditions?

A.✓ ADS will initiate after ~ 12.7 minutes have elapsed.

B. ADS will initiate as soon as ~ 1.7 minutes have elapsed.

C. ADS will NOT initiate because no RHR pumps are running.

D. ADS will NOT initiate because no Core Spray pumps are running.

19. 219000K3.01 001/03401E11/90000.014/NEW/SYS-B/BOTH/219000K3.01/2/2/H/3/ABG/ARB

Unit 2 is operating at 100% RTP with a leaking SRV.

IAW 34SO-E11-010-2, Residual Heat Removal System, RHR Loop B is in Torus Cooling.

At 11:00, Torus temperature is 93°F, lowering at 0.1 degrees / minute.

At 11:05, the instrument line, attached to the RHRSW inlet pressure switches on RHR HX B, is sheared off.

Based on the above conditions, which ONE of the choices below completes the following statements?

At 11:00, two (2) loops of Torus Cooling __________ REQUIRED to be in service.

After 11:05, the Torus water temperature will __________ .

A. are NOT;
continue to lower at the current rate

B.✔ are NOT;
start to go up

C. are;
continue to lower at the current rate

D. are;
start to go up

19. 219000K3.01 001

Description:

MOVs E11-F068A/B are interlocked shut until RHRSW Pressure on the inlet of the RHR heat exchanger is $\geq$ 30 psig. This interlock is temporarily overridden on an initial RHRSW PUMP START.

These valves will not open unless there is 30 psig RHRSW pressure at the inlet of the heat exchanger (or during startup with the Interlock Override Vlv E11-F068A/B keylock switch in "OVERRIDE"), which indicates at least one RHRSW Pump is adequately supplying that Heat Exchanger.

IAW 34AB-T23-003/2,

4.3 IF Suppression Pool bulk average temperature exceeds 95°F, CONFIRM OR place RHR in Suppression Pool cooling per 34SO-E11-010-2, Residual Heat Removal.

4.4 IF testing is in progress that adds heat to the Suppression Pool, RECORD Suppression Pool bulk average temperature on Attachment 1 every 5 minutes.

4.5 IF Suppression Pool bulk average temperature exceeds 100 F, START ALL available RHR loops in Suppression Pool Cooling AND enter 31EO-EOP-012-2, PC Primary Containment Control AND perform concurrently with this procedure.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine how a RHRSW pressure instrument line pipe rupture (fault, resulting in loss Torus cooling due to F068B closing) will affect the Torus water temperature heatup rate (Torus pool temperature control.)

The "A" distractor is plausible since the first part is correct. The second part is plausible since the F068B will remain open if the Interlock Override Vlv E11-F068B, keylock switch is left in OVERRIDE position after the first RHRSW Loop B pump is started (current cooldown rate will continue).

"B" is Correct.

The "C" distractor is plausible since two loops of RHR would be required if Torus temperature exceeded 100°F. The second part is plausible since the F068B will remain open if the Interlock Override Vlv E11-F068B, keylock switch is left in OVERRIDE position after the first RHRSW Loop B pump is started (current cooldown rate will continue).

The "D" distractor is plausible since two loops of RHR would be required if Torus temperature exceeded 100°F. The second part is correct.

19. 219000K3.01 001

References provided to the applicant:

NONE

K/A:

219000 RHR/LPCI: Torus/Suppression Pool Cooling Mode

K3. Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE will have on following: (CFR: 41.7 / 45.4)

K3.01 Suppression pool temperature control 3.9 4.1

LESSON PLAN/OBJECTIVE:

E11-RHRSW-03401, RHR SERVICE WATER SYSTEM , **Ver. 7.0**, LO 90000.014

Reference(s) used to develop this question:

34SO-E11-010-2, Residual Heat Removal System, **Ver. 42.11**
34AB-T23-003-2, Torus Temperature Above 95°F, **Ver. 2.6**

20. 223002K1.14 001/01301PC/013.046.A.05/NEW/ SYS-B/BOTH/223002K1.14/2/1/H/2/ABG/ARB

Unit 2 was operating at 100% RTP when an event occurs resulting in the following plant conditions:

o RPV Pressure	850 psig (lowest reached)
o RWL	-30 inches (lowest reached)

Based on the above conditions, which ONE of the choices below completes the following statements?

One (1) minute later, 2G11-F019 and 2G11-F020, Drywell Equipment Drain Valves, will be __________ .

2G11-F019 and 2G11-F020 position indications __________ be monitored from SPDS .

A. open;
can

B. open;
can NOT

C.✓ closed;
can

D. closed;
can NOT

20. 223002K1.14 001

Description:

H-LT-NL-LP-T23-01301

Drywell Floor (G11-F003, G11-F004) and Equipment (G11-F019, G11-F020) Drain Sump Isolation Valves, are also isolated upon either reactor water level lowering to +3.0 inches or drywell pressure rising to 1.85 psig (Group 2 isolation signal).

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant if Drywell Equipment Drain Valves will isolate on a Group Two Primary Containment Isolation signal of RWL less than +3 inches (physical connections and/or cause/effect relationships).

The "A" distractor is plausible since the first part is not exceeding the Group Five (RWCU) Low RWL isolation of -35 inches, therefore valves remaining open. The second part is plausible since it is correct.

The "B" distractor is plausible since the first part is not exceeding the Group Five (RWCU) Low RWL isolation of -35 inches, therefore valves remaining open. The second part is plausible since there are PCIV positions that can not be verified via SPDS (Some Fission Product Valves).

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since there are PCIV positions that can not be verified via SPDS (Some Fission Product Valves).

20. 223002K1.14 001

References provided to the applicant:

NONE

K/A:

223002 Primary Containment Isolation System/Nuclear Steam Supply Shut-Off

K1. Knowledge of the physical connections and/or cause/effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.14 Containment drainage system 2.8 3.1

IAW CHIEF EXAMINER BRUNO CABALLERO, THE BELOW K/A WAS REPLACED WITH THE ABOVE K/A ON 1/18/2019.

K1. Knowledge of the physical connections and/or cause/effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.15 High pressure core spray : Plant-Specific 3.4 3.4

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T23-01301, Primary Containment, **Ver. 10.0**, LO 013.046.A.05

Reference(s) used to develop this question:

34AB-C71-001-2, SCRAM Procedure, **Ver. 13.3**
34SO-G11-013-2, Drywell and Reactor Building Sumps Systems, **Ver. 1.3**

21. 223002K1.19 001/03301P41/90000.004/MOD/SYS-I/BOTH/223002K1.19/2/1/H/2/ABG/ARB

Unit 2 was operating at 100% RTP when a transient resulted in the following:

- o RWL -30 inches
- o Drywell pressure 2.1 psig

Two (2) minutes later and based on the above conditions, which ONE of the choices below completes the following statements?

PSW Outlet flow from the RBCCW Heat Exchanger will be __________ .

2P42-F052, RBCCW Drywell Outlet Isolation valve, __________ have automatically closed.

A. lower;
will

B.✔ lower;
will NOT

C. approximately the same;
will

D. approximately the same;
will NOT

21. 223002K1.19 001

Description:

2P42-F316A-D, Turbine Building Isolation Valves, will isolate:

- RWL -101 inches
- Drywell Pressure 1.85 psig
- LOSP when power restored to 4160 VAC E & G Buses
- Condenser Room Flooding

PSW is the cooling medium for RBCCW and when the 2P42-F316A-Ds isolate the RBCCW pump suction temp will rise.

2P42-F051/ 2P42-F052 , RBCCW Drywell Inlet/ Outlet Primary Containment Isolation Valves. They are MOVs operated from the Control Room.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to recognize that Dywell Pressure has exceeded the Primary Containment Isolation Instrumentation setpoint for the Dywell Pressure High LOCA signal to the PSW system Turbine Building Isolation Valves closing on interlock. Then **relating** the closing of the Turbine Building Isolation Valves to **cause** a loss of cooling to the RBCCW system.

The "A" distractor is plausible since the first part is correct. The second part is plausible since several other Primary Containment Isolation Valves do isolate on high drywell pressure.

"B" is Correct.

The "C" distractor is plausible since it would be correct if the Turbine Building Isolation Valves were overriden. The second part is plausible since several other Primary Containment Isolation Valves do isolate on high drywell pressure.

The "D"distractor is plausible since it would be correct if the Turbine Building Isolation Valves were overriden. The second part is correct.

21. 223002K1.19 001

References provided to the applicant:

NONE

K/A:

223002 Primary Containment Isolation System/Nuclear Steam Supply Shut-Off

K1. Knowledge of the physical connections and/or cause effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.19 Component cooling water systems 2.7 2.9

LESSON PLAN/OBJECTIVE:

P41-PSW-03301, Plant Service Water System, **Ver. 12.1**, LO 90000.004
P42-RBCCW-00901, Reactor Building Closed Cooling Water, **Ver. 5.0** LO 90000.013

Reference(s) used to develop this question:

Unit 2 TRM TABLE T7.0-1, PRIMARY CONTAINMENT PENETRATIONS, **Rev. 25**
HLT BANK QUESTION LT-033015-007

Unit 2 has experienced a transient resulting in the following plant conditions:

o Lowest RWL	-35 inches, rising slowly
o Drywell pressure	3.0 psig, stable
o PSW Turbine Bldg Isolation Valves (2P41-F316A-D)	closed
o RBCCW suction temp (2P42-R600)	100°F, rising slowly
o RFPT 2A BRG TEMP HIGH, (650-329)	Alarm in

The PSW Turbine Bldg Isolation Valves (2P41-F316A-D) __________ respond properly to the above conditions.

Opening PSW Turbine Bldg Isolation Valves (2P41-F316A-D) __________ lower Reactor Building Closed Cooling Water suction temperature.

A. did;
will NOT

B.✓ did;
will

C. did NOT;
will

D. did NOT;
will NOT

22. 233000K5.06 001/04501G41/90000.009/NEW/SYS-B/BOTH/233000K5.06/2/2/F/3/ABG/ARB

Which ONE of the choices below completes the following statements concerning the **Unit 1** Fuel Pool Cooling (FPC) System?

The TOTAL number of **Unit 1** FPC pumps is __________ .

During core off load conditions, the FPC System is designed to maintain pool water temperature BELOW the EOP entry temperature of __________ .

A. one (1);
120°F

B. one (1);
150°F

C. two (2);
120°F

D.✓ two (2);
150°F

22. 233000K5.06 001

Description:

Bruno, this was a Pre-submittal RO question. Changes were incorporated based on your ES-401-9 comments.

FSAR 9.1.3 States Normal Heat Load capacity as maintaining temp < 150 °F under normal operating conditions, and core offloads conditions.

H-LT-NL-LP-G41-FPC-04501
Maintains pool water temperature below 139°F under normal operating conditions, below 133°F during refueling conditions, and below 150°F during core offload conditions.

Unit 1 has two FPC pumps, two heat exchangers, and two demineralizers.
Unit 2, which has only one FPC loop with 1 FPC pump, one heat exchanger, and one demineralizers.

Maintain pool water temperature below **150°F** during core offloads

The Secondary Containment Control flowchart is entered if ANY of the following six conditions exist:

A. ANY area ambient or differential temperature above the Maximum Normal Operating Temperature. (Table SC-1.2)
B. ANY area or floor drain sump level above the Maximum Normal Operating Water Level. (Table SC-1.3)
C. ANY area or HVAC exhaust radiation level above Maximum Normal Operating Level. (Table SC-1.4)
D. Building differential pressure at or above 0 inches of water.
E. SFP temperature above **150°F Maximum Normal Operating** Temperature
F. SFP Water Level below 22 foot 0.5 inch Minimum Normal Operating Level

34SO-G41-003-1,
5.2.11 IF the Fuel Pool temperature reaches **120 °F** WHILE performing any infrequent operation per this procedure, return the FPC system to normal alignment AND place in service per the applicable subsection of this procedure

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know the Maximum normal heat load (Maximum Normal Operating Temperature) which is also the entry temperature for the Secondary Containment EOP flowchart (operational implications) for Fuel Pool operating temperature.

The "A"distractor is plausible since the first part is true for Unit 2. The second part is plausible since this is the temperature while performing any infrequent operation where the FPC system will be returned to a normal alignment.

The "B"distractor is plausible since the first part is true for Unit 2. The second part is correct.

The "C" distractor is plausible since the first part is correct. The second part is plausible since this is the temperature while performing any infrequent operation where the FPC system will be returned to a normal alignment.

"D" is Correct.

22. 233000K5.06 001

References provided to the applicant:

NONE

K/A:

233000 Fuel Pool Cooling and Clean-up

K5. Knowledge of the operational implications of the following concepts as they apply to FUEL POOL COOLING AND CLEAN-UP : (CFR: 41.5 / 45.3)

K5.06 Maximum normal heat load 2.5 2.7

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-G41-FPC-04501, Fuel Pool Cooling and Cleanup, **Ver. 8.0**, LO 90000.009

Reference(s) used to develop this question:

FSAR 9.1.3 Fuel Pool Cooling and Cleanup System, **Rev 35**
34SO-G31-003-2, Fuel Pool Cooling And Cleanup System, **Ver. 27.3**

23. 234000K5.04 001/04501G41/90000.009/NEW/SYS-B/BOTH/234000K5.04/2/2/F/2/ABG/ARB

Which ONE of the choices below completes the following statements?

IAW **Unit 1** TS 3.7.8, Spent Fuel Pool Water Level, irradiated fuel assemblies seated in the Spent Fuel Pool Storage Racks are required to be covered by at LEAST __________ feet of water.

The Fuel Pool Cooling System components designed to minimize the inventory loss from the Fuel Pool are the __________ on the return lines.

A.✓ 21;
Anti-Siphon check valves

B. 21;
Diffusers

C. 23;
Anti-Siphon check valves

D. 23;
Diffusers

23. 234000K5.04 001
Description:

Bruno, this was a Pre-submittal RO question. Changes were incorporated based on your ES-401-9 comments.

G41-FPC-LP-04501
Anti-siphon check valves are provided in each inlet pipe from the fuel pool cooling demineralizer discharge back to the fuel pools. These check valves (two valves in series) are located near the normal fuel pool water level to prevent a loss of water from the fuel pools due to siphoning. As fuel pool level drops, the check valves reposition to prevent drawing of fuel pool water into the break.

H-LT-LP-F15-RF-04502

LCO 3.7.8 The spent fuel storage pool water level shall be 21 ft over the top of irradiated fuel assemblies seated in the spent fuel storage pool racks.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know the Fuel Pool Cooling System components designed to minimize the inventory loss from the Fuel Pool are the Anti-siphon check valves and Technical Specification for Fuel Pool Water Level.

"A" is Correct.

The "B" distractor is plausible since the first part is correct.. The second part is plausible since the Decay Heat Removal System does have a holed diffuser to prevent siphoning.

The "C" distractor is plausible since the first would be correct for the RPV water level above the irradiated fuel in the vessel. The second part is correct.

The "D" distractor is plausible since the first would be correct for the RPV water level above the irradiated fuel in the vessel. The second part is plausible since the Decay Heat Removal System does have a holed diffuser to prevent siphoning.

23. 234000K5.04 001

References provided to the applicant:

NONE

K/A:

234000 Fuel Handling Equipment

K5. Knowledge of the operational implications of the following concepts as they apply to FUEL HANDLING EQUIPMENT : (CFR: 41.5 / 45.3)

K5.04 Spent fuel pool design 2.6 3.1

LESSON PLAN/OBJECTIVE:

H-LT-NL-G41-FPC-04501, Fuel Pool Cooling, **Ver. 8.0**, LO 90000.009
H-LT-LP-F15-RF-04502, Refueling, **Ver. 7.0** LO H-OP-90000.005

Reference(s) used to develop this question:

FSAR 9.1.2 WET SPENT-FUEL STORAGE (HNP-1 AND HNP-2), **Rev 35**

24. 239002A4.05 001/01401B21/014.003.A.06/MOD SYS-B/BOTH/239002A4.05/2/1/H/3/ABG/ARB

Unit 2 is operating at 100% RTP.

- The **fuses** are pulled for SRV 2B21-F013B

A spurious Group I signal is received, resulting in ten (10) SRVs opening.

Subsequently, RPV pressure has just reached its LOWEST value as indicated below:

2B21-R623B
RX Water Level/RX Press

2B21-R623A
RX Water Level/RX Press

Which ONE of the choices below completes the following statements?

Based on the above conditions, currently, the TOTAL number of SRVs open is ________ .

Monitoring RPV pressure utilizing 2B21-R623A/B is performed at ________ .

A. zero (0);
2H11-P601

B. zero (0);
2H11-P603

C. one (1);
2H11-P601

D. one (1);
2H11-P603

24. 239002A4.05 001

Description:

With RPV pressure peaking high enough to cause all SRVs to open (1140 psig to 1150 psig), LLS will arm and maintain reactor pressure between 851 psig and 1036 psig.

Once initiated, LLS will control reactor pressure by cycling 2B21-F013B, D, F, G at the following pressures:

VALVE	OPEN	CLOSE
2B21-F013D	1036 psig	890 psig
2B21-F013F	1027 psig	881 psig
2B21-F013G	1012 psig	**866 psig**
2B21-F013B	997 psig	851 psig

With SRV 2B failed, the highest RPV pressure where all LLS valves will be closed is 865 psig. If SRV 2B was functioning properly, the highest RPV pressure where all LLS valves will be closed is 850 psig. The other two LLS valves will close when RPV pressure drops to 889 psig and 880 psig, respectively.

2B21-R623A, RX Water Level/RX Press, located 2H11-P601

K/A JUSTIFICATION:

The question satisfies the K/A statement by asking the applicant the total number of SRVs that will be open as RPV pressure lowers (monitor) and where to monitor the RPV pressure instrumentation.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since there are digital RPV pressure indications (2C32-R608, 2C32-R609) located on the 2H11-P603 panel.

The "C" distractor is plausible if SRV B was not failed closed, it would have remained open until 851 psig, this would also be correct for Unit 1 with a failed SRV H (SRV A would not close until 862 psig). The second part is plausible since it is correct

The "D"distractor is plausible if SRV B was not failed closed, it would have remained open until 851 psig, this would also be correct for **Unit 1** with a failed SRV H (SRV A would not close until 862 psig). The second part is plausible since there are digital RPV pressure indications (2C32-R608, 2C32-R609) located on the 2H11-P603 panel.

24. 239002A4.05 001

References provided to the applicant:

NONE

K/A:

239002 Relief/Safety Valves

A4. Ability to manually operate and/or monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.05 Reactor pressure 4.3* 4.3*

LESSON PLAN/OBJECTIVE:

B21-SLLS-LP-01401, Main Steam and Low Low Set, **Ver. 11.2**, EO 014.003.A.06

Reference(s) used to develop this question:

Modified from Hatch ILT Bank Q# 239002K3.01-007

ORIGINAL QUESTION

Unit 2 was at 100% RTP when All MSIVs CLOSED.

- o Ten (10) SRV amber lights ILLUMINATED
- o SRV 2B FAILED to OPEN, amber light EXTINGUISHED
- o Currently, ONLY SRVs 2D, 2F & 2G are OPEN

Based on the above conditions,

The HIGHEST listed RPV pressure at which the currently OPEN SRVs will ALL be closed is __________ .

A. 850 psig

B.✓ 865 psig

C. 880 psig

D. 889 psig

25. 241000K1.34 001/01902N32/H-OP-90000.001/MOD/SYS-I/BOTH/241000K1.34/2/2/H/3/ARB/ABG

Unit 2 is operating at 15% RTP with the Main Turbine in "CHEST WARMING".

Subsequently, the pressure transmitters that input into the DEHC Pressure Control Unit malfunction causing all Main Turbine Bypass Valves to FULLY OPEN.

Based on the above conditions,

Selecting the "Close Valves" button on the Turbine HMI screen __________ CLOSE the Main Turbine Bypass valves.

The pressure transmitter inputs used to control Bypass valve position sense __________ .

A. will;
RPV Pressure

B. will;
Turbine Inlet Main Steam (Throttle) Pressure

C. will NOT;
RPV Pressure

D.✓ will NOT;
Turbine Inlet Main Steam (Throttle) Pressure

25. 241000K1.34 001

Description:

When CLOSE VALVES is selected, the Speed Reference signal is negative, forcing the TSVs, TCVs and IVs closed. ISVs remain open.

BPV	Bypass Valve
ISV	Intermediate Stop Valve
IV	Intermediate Control Valve
TCV	Turbine Control Valve
TSV	Turbine Stop Valve

Reactor Pressure Algorithm (P1)

The pressure control system controls reactor pressure during plant startup, power generation and shutdown modes of operation. The Mark VI pressure controller, P1, acts to ensure that the desired pressure set point is achieved by coordinating the positioning of the TCVs which respond to the turbine controller's speed/load set point commands, and the BPVs in response to changes in the pressure set point error. Under steady state operating conditions, the RO adjusts the reactor steam production to match the turbine load demand and the CVs are effectively regulating the steam pressure. In essence, the turbine is following the reactor. However, whenever the total steam flow delivery exceeds the effective turbine steam flow need or capacity, the BPVs are opened to regulate the pressure and send the excess steam directly to the condenser. The RO maintains control over the rate of steam production to meet the plant's steam demands - these control functions take place outside of the Mark VI controllers. The turbine operator uses the HMI to set the desired operating pressure set point.

Pressure control is designed to control reactor pressure during the following conditions:

a. RPV heat up to rated
b. Turbine roll & synchronization
c. When reactor steam generation exceeds the turbine steam flow requirements during power operation
d. Plant load rejections and turbine trip/generation trips
e. Reactor cool down

The reactor pressure control algorithm is designed to operate using three pressure transmitter inputs located in the steam flow path. The control strategy uses three pressure transmitters tapped into the MSL just upstream of the MSVs & is called **turbine inlet main steam (throttle) pressure control**. The pressure regulator compares the measured steam supply pressure to the turbine operator entered pressure demand and develops the steam flow demand for both the CVs and BPVs based on the magnitude of the pressure error. The output for the pressure regulator has the ability to drive the control valves to their 100% open position plus the capability of continuing to drive the BPVs to their 100% open position. The regulation for the TCVs and the BPVs in terms of percent change of the output from the pressure regulator versus the percent change of steam flow is uniform from control valves closed to control valves and bypass valves full open.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to know the cause effect relationship of the turbine pressure regulating system and EGC (DEHC - Bypass valve position and the pressure transmitter inputs (physical connections) used to control Bypass valve position).

The "A" is plausible since other valves (TSVs, TCVs and IVs) will travel close when this button is selected. The second part is plausible since DEHC controls RPV pressure by making adjustments to Turbine valves based upon Throttle pressure.

The "B" is plausible since other valves (TSVs, TCVs and IVs) will travel close when this button is selected. The second part is plausible since it is correct.

The "C" distractor is plausible since the first part is correct. The second part is plausible since DEHC controls RPV pressure by making adjustments to Turbine valves based upon Throttle pressure.

"D" is Correct.

25. 241000K1.34 001

References provided to the applicant:

NONE

K/A:

241000 Reactor/Turbine Pressure Regulating System

K1. Knowledge of the physical connections and/or cause effect relationships between REACTOR/TURBINE PRESSURE REGULATING SYSTEM and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.34 EGC system: Plant-Specific 2.8 3.3

AFTER PHONE CONVERSATION WITH CHIEF EXAMINER BRUNO CABALLERO ON 1/18/2019, DEHC WILL BE CONSIDERED AS AN EGC SYSTEM.

LESSON PLAN/OBJECTIVE:

N32-DEHC-LP-01902, Digital EHC, **Ver. 13.0,** LO H-OP-90000.001

Reference(s) used to develop this question:

Modified from HLT Database which was used on 2013 HLT-8 NRC Exam Q#25

ORIGINAL QUESTION

Unit 2 is operating at 15% RTP with the Main Turbine in "Chest Warming".

Subsequently, throttle pressure transmitters malfunction causing all Main Turbine Bypass Valves to fully open.

When the Main Turbine Bypass Valves open, indicated Reactor Water Level will INITIALLY __________ .

Selecting the "Close Valves" button on the Turbine HMI screen __________ CLOSE the Main Turbine Bypass valves.

A. decrease;
will NOT

B. decrease;
will

C.✓ increase;
will NOT

D. increase;
will

Modified from HLT Database which was used on 2009 HLT-5 NRC Exam Q#40

ORIGINAL QUESTION

Which ONE of the following completes both these statements?

The Main Turbine Bypass valves OPEN following a main turbine trip from full power to prevent _____________.

The pressure transmitter inputs used to control Bypass valve position sense ____________.

A. over pressurization of the Reactor vessel;
reactor pressure

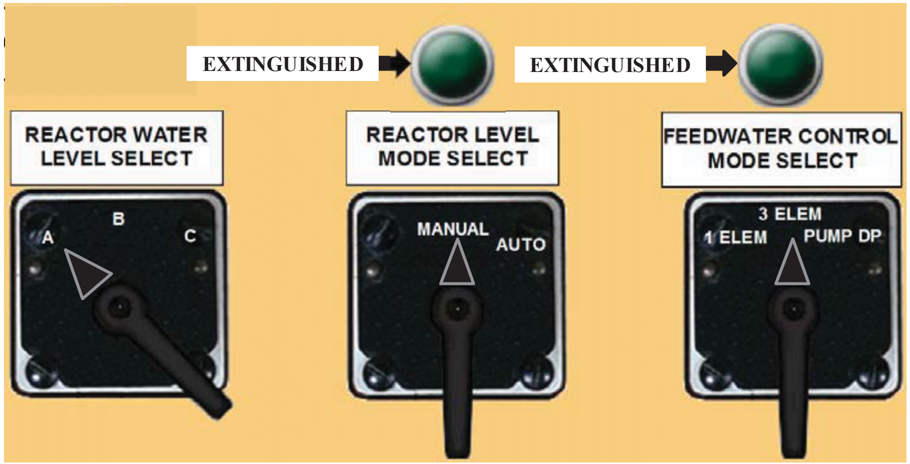
B. rupture LP Turbine rupture discs;
turbine inlet main steam (throttle) pressure

C.✓ over pressurization of the Reactor vessel;
turbine inlet main steam (throttle) pressure

D. rupture LP Turbine rupture discs;
reactor pressure

26. 259002K5.01 001/0201N21/90000.001/MOD/SYS-I/BOTH/259002K5.01/2/1/H/2/ABG/ARB

Unit 2 is at 75% RTP with the following RWLC System indications:



NOTE: 2C32-R600, FW Master Controller, is operating in AUTOMATIC.

Based on the above conditions,

2C32-R600, FW Master Controller, is currently using the __________ as its value for RWL.

The FW Master Controller is currently operating in __________ Control.

A✓ instrument selected from the Reactor Water Level Select switch;
Single Element

B. instrument selected from the Reactor Water Level Select switch;
Three Element

C. Median Level Signal Processor, 2C32-K648 output;
Single Element

D. Median Level Signal Processor, 2C32-K648 output;
Three Element

26. 259002K5.01 001

Description:

Bruno, this was a Pre-submittal RO question. Changes were incorporated based on your ES-401-9 comments.

Reactor Water Level Mode Select;

AUTO position

Primary:	Utilizes the output of the Median Level Signal Processor.
Alternate:	Utilizes the signal selected by the Reactor Water Level Select switch as the input signal for the RFPT Master Controller (C32-R600) & the SULCV Controller (C32-R619)

MAN position

Primary:	Utilizes the signal selected by the Reactor Water Level Select switch.
Alternate:	Utilizes the Median level Signal Processor as the input for the RFPT Master Controller (C32-R600) & the SULCV Controller (C32-R619).

If the Master Controller determines that the primary input is over ranged high or low, it will automatically swap to the alternate input **REGARDLESS** of the Reactor Water Mode Select switch position. The GREEN lamp above the Reactor Water Mode Select switch can be used to determine which input the Master Controller is using. If the GREEN lamp above the Reactor Water Mode Select switch is **ILLUMINATED** then the Master Controller is using the Median Level Signal Output (K648). If the GREEN lamp above the Reactor Water Mode Select switch is **EXTINGUISHED** then the Master Controller is using the instrument **selected** by the Reactor Water Level Select switch.

With the green light above the "Reactor Level Mode Select" extinguished, the Master Controller is utilizing the MAN - Primary which is the signal selected by the Reactor Water Level Select switch to control RFPTs.

The indicating light above the Feedwater Control Mode Select Switch on panel 2H11-P603 ONLY ILLUMINATES WHEN the Master Controller is controlling using the 3 Element signal.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know how the FW Controller will operate (controller operation) based on the controller switch positions and the status of indicating lights associated with RWLC System (operational implication).

"A" is Correct.

The "B"distractor is plausible since the first part is correct. The second part is plausible since one of the switches only functions in the selected position (RWL Select Switch position equals selected instrument) and since the Feedwater Control Mode Select Switch is in the 3 ELEM position, selects three element.

The "C"distractor is plausible since this would be correct if the green light above the Reactor Level Mode Select switch was ILLUMINATED. The second part is correct.

The "D"distractor is plausible since this would be correct if the green light above the Reactor Level Mode Select switch was ILLUMINATED. The second part is plausible since one of the switches only functions in the selected position (RWL Select Switch position equals selected instrument) and since the Feedwater Control Mode Select Switch is in the 3 ELEM position, selects three element.

26. 259002K5.01 001

References provided to the applicant:

NONE

K/A:

259002 Reactor Water Level Control System

K5. Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER LEVEL CONTROL SYSTEM : (CFR: 41.5 / 45.3)

K5.01 GEMAC/Foxboro/Bailey controller operation: Plant-Specific 3.1 3.1

IAW CHIEF EXAMINER BRUNO CABALLERO, THE BELOW K/A WAS REPLACED WITH THE ABOVE K/A ON 3/6/2019.

K5. Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER LEVEL CONTROL SYSTEM : (CFR: 41.5 / 45.3)

K5.08 Heat removal mechanisms: FWCI 3.6 3.8

LESSON PLAN/OBJECTIVE:

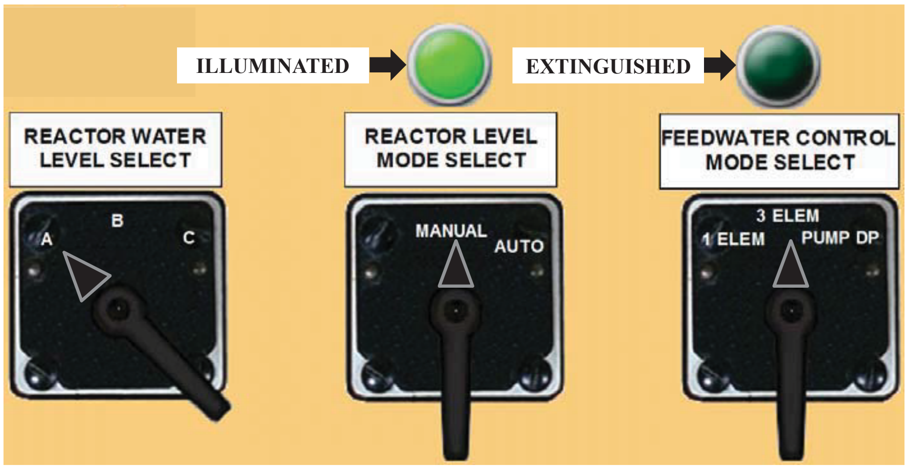
H-LT-NL-LP-C32-RWLC-00202, Reactor Water Level Control, **Ver. 7.0,** EO 002.019.A.01

Reference(s) used to develop this question:

34SO-N21-007-2, Condensate and Feedwater System, **Ver. 55.0**
Modified from HLT Database which was used on HLT-10 NRC Exam Q#25

ORIGINAL QUESTION

Unit 2 is at 75% RTP with the following RWLC System indications:



NOTE: 2C32-R600, FW Master Controller, is operating in AUTOMATIC.

Based on the above conditions,

2C32-R600, FW Master Controller, is currently using the __________ as its value for RWL.

The FW Master Controller is currently operating in __________ Control.

A. instrument selected from the Reactor Water Level Select switch;
Single Element

B. instrument selected from the Reactor Water Level Select switch;
Three Element

C.✓ Median Level Signal Processor, 2C32-K648 output;
Single Element

D. Median Level Signal Processor, 2C32-K648 output;
Three Element

27. 261000G2.4.50 001/03001T46/030.001.A.01/NEW/P ARP/BOTH/261000G2.4.50/2/1/H/3/ABG/ARB

Unit 2 was operating at 100% RTP when an event occurred resulting in an automatic start of the SBGT system.

A NPO secures SBGT 2B by placing the SBGT 2B fan control switch to the OFF position and then places the switch to the STBY position. (ONLY switch manipulated)

Subsequently, 2A SBGT FLTR DIFF PRESS HIGH, 657-055, ILLUMINATES.

Continued SBGT operation is required.

Based on the above conditions, which ONE of the choices below completes the following statements IAW 657-055?

SBGT 2A differential pressure, will be confirmed on 2T46-R603A, located on panel __________ .

If SBGT 2A differential pressure is greater than the annunciator set point, then SBGT 2B __________ started.

A. 2H11-P601;
must be manually

B. 2H11-P601;
will have automatically

C✓ 2H11-P700;
must be manually

D. 2H11-P700;
will have automatically

27. 261000G2.4.50 001

Description:

2A SBGT FLTR DIFF PRESS HIGH, 34AR-657-055-2

DEVICE: 2T46-DPR-R603A SETPOINT: 5.7" WC

2.0 CONDITION: High differential pressure across SBGT A Filter, 2T46-D001A

5.1 Check 2T46-D001A, SBGT A Filter, differential pressure > 5.7" WC as indicated on 2T46-R603A, located on **2H11-P700**.

5.2 IF 2T46-D001A, SBGT A Filter, differential pressure is > 5.7" WC AND continued SBGT operation is required, START 2T46-D001B, SBGT B Fan/Filter, in accordance with the Manual Startup Section of 34SO-T46-001-2, Standby Gas Treatment System.

LP T46-SBGT-03001

Four Position Control Switch S1A/B.

- o OFF secures the respective filter train and removes all auto-initiations.
- o STBY is used to secure one filter train after both have started due to an initiation signal. This position will secure its respective filter train but will allow it to restart if low flow is sensed in the running filter train.
- o AUTO is the normal position when the SBGT system is in Standby. It will cause the filter train to start on any of the system auto-initiation signals (Both filter trains are normally in Auto).
- o RUN is used to manually start the system.

If a SBGT fan's switch is placed in standby (STBY), the fan will auto start if the other fan for the same unit is not operating. Example: Both Unit 2 SBGT fans are in AUTO, there is NO automatic initiation signal present, and neither fan is running. If an operator places the 2A SBGT fan to STBY, the fan will automatically start due to low flow on the 2B fan.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to identify the location to verify 657-055 annunciator alarming condition and the alarm response actions required based on the current system condition.

The "A"distractor is plausible since the SBGT filter train high radiation annunciator is located on the 2H11-P601 panel. The second part is correct.

The "B"distractor is plausible since the SBGT filter train high radiation annunciator is located on the 2H11-P601 panel. The second part is plausible since the SBGT 2B would automatically start if the SBGT 2A was not running with its control switch in AUTO.

"C" is Correct.

The "D"distractor is plausible since the first part is correct. The second part is plausible since the SBGT 2B would automatically start if the SBGT 2A was not running with its control switch in AUTO.

27. 261000G2.4.50 001

References provided to the applicant:

NONE

K/A:

261000 Standby Gas Treatment System

G2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual. (CFR: 41.10 / 43.5 / 45.3) 4.2 4.0

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T46-SBGT-03001, Standby Gas Treatment, **Ver. 7.0**, LO 030.001.A.01

Reference(s) used to develop this question:

34AR-657-055-2, 2A SBGT FLTR DIFF PRESS HIGH, **Ver. 4.1**

28. 262001A2.01 001/02702R22/027.009.A.03/BANK/SYS-I/BOTH/262001A2.01/2/1/H/3/ABG/ARB

Unit 1 is operating at 50% RTP.

4160 VAC 1E, 1R22-S005, is powered from Startup Auxilary Transformer (SAT) 1C.

Subsequently, the Unit 1 Main Turbine trips.

Which ONE of the following completes the statements concerning the Station Service Buses?

After the Main Generator trips, the MAXIMUM number of Station Service Buses that will be energized is __________ .

At this time, 34SO-R22-001-1, 4160V AC System Operation, can be used to MANUALLY re-energize 4160V Buses __________ .

A. ✓ zero (0);
1C and 1D

B. zero (0);
1A and 1B

C. two (2);
1C and 1D

D. two (2);
1A and 1B

28. 262001A2.01 001

Description:

Upon a loss of the Normal Power source to 4160 VAC busses A, B, C and D, the *normal* supply breakers will automatically open and the *alternate* supply breakers will automatically close when both generators output PCBs are opened. This is known as a FAST TRANSFER. This operation normally occurs following a manual or auto turbine trip. It ensures that all loads remain energized. There are several conditions in the electrical distribution system which will lockout (prevent) a fast transfer. Those conditions are as follows:

If the fast transfer does not occur within 0.2 seconds, the automatic fast transfer is locked out, requiring a manual transfer to re-energize the 4160 VAC Station Service Busses 1A, B, C, & D.
If any of the 4160 VAC Emergency Busses are tied to the 1C SAT (Alternate), a fast transfer of house loads is prohibited and the SAT supply breakers to 4160 1A and B receive a trip signal.

When the Main Turbine trips, the Fast transfer will not occur, therefore leaving all Station Service buses de-energized. Manual transfer to SAT 1D is allowed for the 4160 VAC Busses 1C and 1D only, and is required if the generator is no longer available.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to predict the number of energized 4160V AC buses (impact) following the Unit 1 Main Turbine trip; and based on those predictions, use 34SO-R22-001-1, 4160V AC System Operation, to restore the 4160 VAC Buses C & D (correct, control, or mitigate the consequences of those abnormal conditions or operations.)

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible if the alternate power supply to 1A & 1B 4160V AC buses was SUT 1D.

The "C" distractor is plausible since only the 1A & 1B 4160V AC buses receive a trip signal. The second part is correct.

The "D" distractor is plausible since only the 1A & 1B 4160V AC buses receive a trip signal. The second part is plausible if the alternate power supply to 1A & 1B 4160V AC buses was SUT 1D.

28. 262001A2.01 001

References provided to the applicant:

NONE

K/A:

262001 A.C. Electrical Distribution

A2. Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
(CFR: 41.5 / 45.6)

A2.01 Turbine/generator trip 3.4 3.6

LESSON PLAN/OBJECTIVE:

R22-ELECT-LP-02702, 4160 VAC, **Ver. 7.3**, LO 027.009.A.03

Reference(s) used to develop this question:

34AB-R22-004-1, Loss of 4160V Bus 1A, 1B, 1C or 1D, **Ver. 2.9**
34SO-R22-001-1, 4160V AC System Operation, **Ver. 24.2**

HLT Database which was used on 2011 HLT-6 NRC Exam Q#28

29. 262002A4.01 001/02705R25/90000.013/BANK/P-NORM/BOTH/262002A4.01/2/1/F/3/ABG/ARB

Unit 2 is operating at 60% RTP with the following Vital AC switch positions:

- o The Vital AC Return Mode switch is in the MANUAL position
- o The Vital AC Manual Bypass switch is in the NORMAL position
- o The Source Selector Switch is in the INV position

Subsequently, the Vital AC Static Inverter DC Input Breaker OPENS.

Based on the above conditions, which ONE of the choices below completes the following statements?

With failure of the Vital AC Static Inverter DC Input Breaker, the Vital AC System will AUTOMATICALLY transfer to __________ .

When the Vital AC Static Inverter DC Input Breaker is repaired and re-closed, the Vital AC System __________ back to its PREFERRED power supply.

A. 600VAC Bus 2C;
will automatically transfer

B.✓ 600VAC Bus 2C;
must be manually transferred

C. 600VAC Bus 2D;
will automatically transfer

D. 600VAC Bus 2D;
must be manually transferred

29. 262002A4.01 001

Description:

ELECT-LP-02705

3. The Vital AC bus has three different power supplies:

   a. The normal power supply is from 600 VAC Essential Bus D (R23-S004) through the Vital AC Battery Charger.

   b. The backup DC power supply is from the 240 VDC Vital AC Batteries. The batteries can supply power for about two hours.

   c. The alternate power supply is from 600 VAC Essential Bus (R23-S003), through Vital AC 600 to 120 VAC Essential Transformer A.

The Source Selector switch allows the operator to select which component will be monitored (Inverter) for voltage.

The Static Bypass switch, sometimes called a Static Transfer switch, is used to automatically transfer the Vital AC bus to its alternate AC power supply. This transfer happens within a fraction of a cycle. (No loss of power should occur.)

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking when Vital AC transfers back to its preferred source will it be automatic or will manual actions be performed (operate and monitor in control room).

The "A" distractor is plausible since the first part is correct. The second part is plausible since it would be correct if the Vital AC Return Mode switch was in the auto position.

"B" is Correct.

The "C" distractor is plausible since this is a power supply for Vital AC and is powered from an emergency bus. The second part is plausible since it would be correct if the Vital AC Return Mode switch was in the auto position.

The "D" distractor is plausible since this is a power supply for Vital AC and is powered from an emergency bus. The second part is plausible since it is correct.

29. 262002A4.01 001

References provided to the applicant:

NONE

K/A:

262002 Uninterruptable Power Supply (A.C./D.C.)

A4. Ability to manually operate and/or monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.01 Transfer from alternative source to preferred source 2.8 3.1

LESSON PLAN/OBJECTIVE:

R25-ELECT-LP-02705, Vital AC Electrical, **Ver. 4.1**, LO 90000.013

Reference(s) used to develop this question:

34SO-R25-002-2, 120/240 Volt Vital AC System, **Ver. 5.3**
Bank question from HLT Database

30. 263000A2.02 001/03703Z41/90000.001/BANK/P-AB/BOTH/263000A2.02/2/1/F/2/ABG/ARB

Unit 2 is operating at 100% RTP, with the 2R42-S001A and 2R42-S001B , 125/250VDC Station Service Batteries, on equalize charge, when the Control Building ventilation is lost.

Which ONE of the below responses correctly predicts the following?

A consequence of losing the Control Building ventilation would be __________ .

IAW 34AB-T41-001-2, Loss Of ECCS, MCREC Or Area Ventilation Systems, the operator will __________ .

A.✓ Hydrogen concentration will rise in the battery rooms;
start Emergency Exhaust Fans 2Z41-C014 and 2Z41-C015

B. Hydrogen concentration will rise in the battery rooms;
open DC breakers to minimize loads on 2R22-S016 and 2R22-S017

C. Battery Chargers will trip on high temperature;
start Emergency Exhaust Fans 2Z41-C014 and 2Z41-C015

D. Battery Chargers will trip on high temperature;
open DC breakers to minimize loads on 2R22-S016 and 2R22-S017

30. 263000A2.02 001

Description;

With a loss of CR ventilation and battery chargers in service, then the Emergency Exhaust Fans must be started to prevent hydrogen buildup. The battery chargers cause an alarm on high temperatures but have internal fans that keep them cool.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to predict the rise in hydrogen concentration in the Station Service Battery room as a result of the loss of Control Building ventilation. Then based on the rising hydrogen concentration, using 34AB-T41-001-2, start Emergecny Exhaust fans (procedure use to mitigate the condition.)

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since minimizing DC loads are actions done during a Station Blackout condition.

The "C"distractor is plausible since the battery chargers do have a high temperature alarm. The second part is correct.

The "D"distractor is plausible since the battery chargers do have a high temperature alarm. The second part is plausible since minimizing DC loads are actions done during a Station Blackout condition..

30. 263000A2.02 001

References provided to the applicant:

NONE

<u>K/A:</u>

263000 D.C. Electrical Distribution

**A2. Ability to (a) predict the impacts of the following on the D.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
(CFR: 41.5 / 45.6)**

A2.02 Loss of ventilation during charging 2.6   2.9

<u>LESSON PLAN/OBJECTIVE:</u>

Z41-CBHVAC-LP-03703, Control Building HVAC, **Ver. 3.0** LO 900000.001

<u>Reference(s) used to develop this question:</u>

34AB-T41-001-2, Loss Of ECCS, MCREC Or Area Ventilation System(s), **Ver. 3.8**
34AR-651-126-2, 125/250V Batt Chgr Malfunction, **Ver. 3.8**
34SO-Z41-004-0, Control Building Ventilation System, **Ver. 9.0**
34AB-R22-003-2, Unit 2 Station Blackout. **Ver. 2.1**

2009 HLT 4 NRC Q#32

31. 264000G2.2.12 001/02801R43/90000.015/NEW/P-NORM/BOTH/264000G2.2.12/2/1/F/2/ABG/ARB

Unit 2 is operating at 100% RTP.

34SV-R43-004-2, Diesel Generator 2A Semi-Annual Test, is in progress.

Based on the above conditions and IAW 34SV-R43-004-2,

The Plant Hatch Administrative Limit for Diesel Generator 2A Main Storage Tank is __________ gallons.

A. 29,520

B. 33,320

C.✓ 35,000

D. 40,000

31. 264000G2.2.12 001

Description:

34SV-R43-004-2

7.1 PRETEST

NOTE:

Plant Hatch administrative limit is a total fuel supply of 175,000 gallons for the Emergency Diesel Generators. This volume is administratively controlled by maintaining a total fuel supply of 35,000 gallons (T.S. 33,320 gallons) in each of the Diesel Generator fuel oil storage tanks.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant displaying the knowledge of the limitations and notes (minimum individual tank level 35,000 gallons.) of 34SV-R43-004-2, Diesel Generator 2A Semi-Annual Test.

The "A"distractor is plausible since this is the level below which Tech Spec. would require immediately delaring the EDG 2A Inoperable.

The "B"distractor is plausible since this is correct for the Tech Spec. limit.

"C" is Correct.

The "D"distractor is plausible since this is the 100% tank value for 2R43-R608A, Control Room Main Tank Indicator, located on 2H11-P652.

31. 264000G2.2.12 001

References provided to the applicant:

NONE

K/A:

264000 Emergency Generators (Diesel/Jet)

G2.2.12 Knowledge of surveillance procedures.
(CFR: 41.10 / 45.13) 3.7   4.1

LESSON PLAN/OBJECTIVE:

R43-EDG-LP-02801, Emergency Diesel Generator, **Ver. 9.0**, LO 90000.015

Reference(s) used to develop this question:

34SV-R43-004-2, Diesel Generator 2A Semi-Annual Test, **Ver. 17.3**

32. 264000K6.03 001/02801R43/90000.014/MOD SYS-B/BOTH/264000K6.03/2/1/H/2/ABG/ARB

Unit 2 is operating at 100% RTP.

Plant events result in the following:

- o EDG 2A supplying power to the associated Emergency Bus

Subsequently, the following occurs:

- o LUBE OIL PRESS LOW, 652-111, ILLUMINATED

An operator reports the following:

- o LUBE OIL PRESS LOW, R43-101, ILLUMINATED
- o 2R43-R016A, Lube Oil Engine Header pressure is 20 psig
- o 2R43-C015A, Engine Driven Lube Oil pump discharge flange has a leak
- o EDG 2A is powering the associated Emergency Bus

Based on the above conditions,

EDG 2A __________ have AUTOMATICALLY tripped.

To shutdown EDG 2A, the first action is to place EDG 2A __________.

A. should;
Start Switch in the STOP position

B✓ should;
Output Breaker to the TRIP position

C. should NOT;
Start Switch in the STOP position

D. should NOT;
Output Breaker to the TRIP position

32. 264000K6.03 001

Description:

LUBE OIL PRESS LOW, 652-111, illuminates at 25 psig lowering (20 psig Unit1)

EDG low lube pressure shutdown is 21 psig (18 psig Unit 1), causing the EMERGENCY ENGINE SHUTDOWN, 652-129 annunciator to illuminate.

To shutdown the EDG from the control room while tied to the bus the EDG output breaker must be opened prior to taking the Star Switch to STOP.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant if the EDG 2A should have tripped (effect) due to a leak (malfunction) on the discharge flange of the Engine Driven Lube Oil pump.

The "A" distractor is plausible since the first part is correct. The second part is plausible since it would be correct if the EDG 2A output breaker was open.

"B" is Correct.

The "C"distractor is plausible since it would be correct for EDG 1A. The second part is plausible since it would be correct if the EDG 2A output breaker was open.

The "D"distractor is plausible since it would be correct for EDG 1A. The second part is correct.

32. 264000K6.03 001

References provided to the applicant:

NONE

K/A:

264000 Emergency Generators (Diesel/Jet)

K6. Knowledge of the effect that a loss or malfunction of the following will have on the EMERGENCY GENERATORS (DIESEL/JET) : (CFR: 41.7 / 45.7)

K6.03 Lube oil pumps 3.5 3.7

LESSON PLAN/OBJECTIVE:

R43 EDG-LP-02801, EMERGENCY DIESEL GENERATORS, **Ver. 9,** LO 90000.014

Reference(s) used to develop this question:

LUBE OIL PRESS LOW, 652-111, **Ver. 4**
LUBE OIL PRESS LOW, R43-101, **Rev. 3**

Modified from HLT Bank Q#264000A1.01-3

ORIGINAL QUESTION

Unit 2 has experienced a Loss of Offsite Power (LOSP).

- o EDG 2A is supplying its associated Emergency Bus

An SO reports the following parameters for the EDG 2A:

o Jacket Coolant pressure	9.5 psig
o Lube Oil temperature	231°F
o Engine speed	920 rpm
o Lube Oil pressure	23 psig
o Crankcase pressure	0.6 inches Water

Based on the above conditions,

EDG 2A __________ have AUTOMATICALLY tripped.

With NO other operator actions being performed, if the EDG 2A Start Switch on 2H11-P652, is placed in the STOP position, EDG 2A will __________ .

A. should;
shutdown

B. should;
continue to run

C. should NOT;
shutdown

D.✓ should NOT;
continue to run

33. 286000A3.03 001/03601FPS/036.020.B.05/NEW/SYS-B/BOTH/286000A3.03/2/2/H/2/ABG/ARB

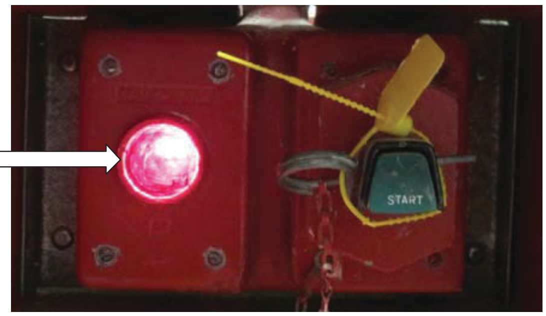
At 14:00, FIRE ALARM, 651-160-1, ILLUMINATED and the following fire alarm is reported:

- o 1X43130C02 DG Room 1A NEW ALARM

At 14:02, an operator arrives in the hallway outside the EDG 1A room and reports the following:

- o A fire exists in EDG 1A room
- o The below indication

ILLUMINATED



Based on the above conditions,

The EDG 1A CO_2 fire suppression system __________ automatically actuated.

With manual or automatic actuation of the CO_2 System into the EDG 1A room, CO_2 __________ be DIRECTLY discharged into a 4160V Switchgear Room.

A. has;
will NOT

B. has;
will

C.✓ has NOT;
will NOT

D. has NOT;
will

33. 286000A3.03 001

Description:

Upon an actuation by a thermal detector a timer controls the activation of alarms, shutdown vents and dampers, causes contol valves to open for a predetermined amount of time and resets for manual operation (Red ready light). The light is off during a CO2 discharge.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine if the EDG CO2 fire suppression system automatically responded to a valid fire detector alarm signal.

The "A"distractor is plausible since there are other systems where initiation lights illuminate when actuated (HPCI). The second part is plausible since it is correct.

The "B"distractor is plausible since there are other systems where initiation lights illuminate when actuated (HPCI). The second part is plausible since the Diesel CO2 system appears to support a larger area than the Computer and Cable Spreading Rooms CO2 system.

"C" is correct.

The "D""distractor is plausible if the applicant since the first part is correct. The second part is plausible since the Diesel CO2 system appears to support a larger area than the Computer and Cable Spreading Rooms CO2 system.

33. 286000A3.03 001

References provided to the applicant:

NONE

K/A:

286000 Fire Protection System

A3. Ability to monitor automatic operations of the FIRE PROTECTION SYSTEM including: (CFR: 41.7 / 45.7)

A3.03 Actuation of fire detectors 3.3 3.3

LESSON PLAN/OBJECTIVE:

X43-FPS-LP-03601, Fire Protection System, **Ver. 6.0** LO 036.020.B.05

Reference(s) used to develop this question:

34SO-X43-005-0, Diesel Generator Building Carbon Dioxide System, **Ver. 0.11**
H-14191, **VER. 15.0**
H-41509, **VER. 5.0**

34. 290002K4.01 001/00401B31/004.002.A.10/NEW/SYS-B/BOTH/290002K4.01/2/2/F/2/ABG/ARB

Which ONE of the following identifies a design feature which will provide 2/3 core coverage following a DBA LOCA?

A.✓ Jet Pump suction elevation

B. Location of the Core Spray Spargers

C. Auto closure of the Recirculation Pump discharge valve

D. Auto closure of the 2E11-F028A, Torus Spray or Test valve

34. 290002K4.01 001

Description:

Because the Jet Pump suction elevation is at 2/3 core height, the vessel can be reflooded and coolant level maintained at 2/3 core height even with the complete break of the recirculation loop pipe that is located below the jet pump suction level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant what component provides the 2/3 core coverage following a DBA LOCA.

"A" is Correct.

The "B" distractor is plausible since Core Spray discharges inside the core shroud and is capable of reflooding the vessel to 2/3 core height with jet pumps intact.

The "C"distractor is plausible since the Recirculation Pump discharge valve closes on a LOCA when RPV pressure lowers to 370 psig, preventing RHR injection from bypassing the core through the Recirculation pipe break.

The "D"distractor is plausible if since the 2E11-F028A, Torus Spray or Test valve closes on a LOCA, preventing RHR injection from bypassing the core to the Torus..

34. 290002K4.01 001

References provided to the applicant:

NONE

K/A:

290002 Reactor Vessel Internals

K4. Knowledge of REACTOR VESSEL INTERNALS design feature(s) and/or interlocks which provide for the following: (CFR: 41.7)

K4.01 2/3 core coverage following a DBA LOCA 3.7 3.9

LESSON PLAN/OBJECTIVE:

B31-RRS-00401, Reactor Recirculation System, **Ver. 12.0**, LO 004.002.A.10

Reference(s) used to develop this question:

Tech Spec Bases 3.4.2 Jet Pumps, **Rev. 95**

35. 290003A2.01 001/03701Z41/90000.014/MOD SYS-B/BOTH/290003A2.01/2/2/H/2/ABG/ARB

Unit 1 is operating at 70% RTP with a confirmed fuel element failure.

A transient occurs which results in the following sequence of events:

- o 12:00 An unisolable pipe break occurs in the HPCI Steam line
- o 12:04 Multiple Area Radiation Alarms are occurring in the Reactor Building
- o 12:05 POSTREATMENT O/G RADIATION HI-HI-HI/INOP, 601-405, ILLUMINATED
- o 12:10 CR OUTSIDE AIR INLET RADIATION HIGH, 601-132, ILLUMINATED

Based on the above conditions, and IAW 34SO-Z41-001-1, Control Room Ventilation System,

The MCREC System will __________ Mode.

The crew will __________ .

A. be manually placed in Isolation;
close 1Z41-F015, Roll Filter Bypass

B. be manually placed in Isolation;
place one of the Recirculation fans, 1Z41-C012A or 1Z41-C012B, in STBY

C. automatically swap to Pressurization;
close 1Z41-F015, Roll Filter Bypass

D.✓ automatically swap to Pressurization;
place one of the Recirculation fans, 1Z41-C012A or 1Z41-C012B, in STBY

35. 290003A2.01 001

Description:

34SO-Z41-001-1, Control Room Ventilation System

7.1.2 Automatic Initiation Of Pressurization Mode

NOTE: The Control Room Ventilation System will switch to the Pressurization Mode on any of the following signals:

1) LOCA from Unit 1 OR 2 (-101 inches RWL, 1.85 PSIG DW Pressure)
2) Refueling floor high radiation from Unit 1 OR 2 (See 64CI-CAL-002-0 for setpoint)
3) Main Steam line high flow from Unit 1 OR 2 (Unit 1, 136 PSID, OR Unit 2, 169 PSID)
4) **Main Control Room air intake high radiation (0.9 MR/hr)**
5) Main Control Room intake radiation monitor downscale (0.017 mR/hr).

7.1.2.4 Place the control switch for 1Z41-C012B (1Z41-C012A), Recirc Fan, to the STANDBY position, on 1H11-P654 (1H11-P657).

CR OUTSIDE AIR INLET RADIATION HIGH, 601-132,
5.2 Confirm the Control Room Ventilation System switches to Pressuization mode, per 34SO-Z41-001-1, Control Room Ventilation System.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know that when the CR OUTSIDE AIR INLET RADIATION HIGH, 601-132, annunciator is received MCREC will automatically shift in to Pressurization mode (predict). Then IAW 34SO-Z41-001-1, Control Room Ventilation System, place one Recirculation fan STBY to control system operation.

The "A"distractor is plausible since this would be correct in the event of a toxic environment outside of the Main Control Room.

The "B"distractor is plausible since this would be correct in the event of a toxic environment outside of the Main Control Room.

The "C"distractor is plausible since the first part is correct. The second part is plausible since closed is the valves normal position and is closed in isolation mode also.

"D" is Correct.

35. 290003A2.01 001

References provided to the applicant:

NONE

K/A:

290003 Control Room HVAC

A2. Ability to (a) predict the impacts of the following on the CONTROL ROOM HVAC ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6)

A2.01 Initiation/reconfiguration 3.1 3.2

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-Z41-MCREC-03701, Main Control Room Environmental Control, **Ver. 9.0**, LO 90000.014

Reference(s) used to develop this question:

34SO-Z41-001-1, Control Room Ventilation System, **Ver. 23.1**
CR OUTSIDE AIR INLET RADIATION HIGH, 601-132, **VER.3.4**

Modified from Hatch Bank Q# 295038EA1.07-001

ORIGINAL QUESTION

Unit 1 is operating at 100% RTP with a confirmed fuel element failure.

A transient occurs which results in the following sequence of events:

- o 12:00 An unisolable pipe break occurs in the HPCI Steam line
- o 12:04 Multiple Area Radiation Alarms are occurring in the Reactor Building
- o 12:05 POSTREATMENT O/G RADIATION HI-HI-HI/INOP, (601-405) alarms
- o 12:10 CR OUTSIDE AIR INLET RADIATION HIGH, (601-132) alarms

To confirm that MCREC is in the proper mode for the above conditions, the operator will verify Z41-F013A & F013B, Filter Train Inlet vlvs are __________ and __________ filter train(s) is/are running

A.✓ open;
both

B. open;
ONLY one

C. closed;
both

D. closed ;
ONLY one

36. 295001AK1.03 001/00401B31/300.006.A.25/BANK/TECH SPECS/BOTH/295001AK1.03/1/1/F/3/ARB/ABG

Unit 2 was operating at 80% RTP when Recirc Pump 2A trips.

Based on the above conditions and IAW TS 3.4.1, Recirculation Loops Operating, for continued single loop operation until the next Refueling outage in 180 days,

The Average Power Range Monitor __________ setpoint is REQUIRED to be adjusted.

The post-event Minimum Critical Power Ratio (MCPR) operational limit will be __________ the pre-event MCPR operational limit.

A. Neutron Flux - High;
different from

B. Neutron Flux - High;
the same as

C✓ Simulated Thermal Power - High;
different from

D. Simulated Thermal Power - High;
the same as

36. 295001AK1.03 001

Description:

TS 3.4.1 LCO states:
Two recirculation loops with matched flows shall be in operation,
OR
One recirculation loop may be in operation provided the following limits are applied when the associated LCO is applicable:

a. LCO 3.2.1, AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR), single loop operation limits specified in the COLR;
b. LCO 3.2.2, **MINIMUM CRITICAL POWER RATIO (MCPR), single loop operation limits** specified in the COLR;
c. LCO 3.2.3, LINEAR HEAT GENERATION RATE (LHGR), single loop operation limits specified in the COLR; and
d. LCO 3.3.1.1, Reactor Protection System (RPS) Instrumentation, Function 2.b (Average Power Range Monitors **Simulated Thermal Power—High**), Allowable Value of Table 3.3.1.1-1 is reset for single loop operation.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant if the APRM setpoint (thermal limit) is required to be adjusted (operational implication) due to the reduce core flow.

The "A" distractor is plausible since APRM Neutron Flux and APRM Simulated Thermal Power are both TS APRM RPS monitored instruments. The second part is correct.

The "B" distractor is plausible since APRM Neutron Flux and APRM Simulated Thermal Power are both TS APRM RPS monitored instruments. The second part is plausible since TS 3.2.2 above the dotted line information does not mention reduced core flow therefore, the applicant believing the two loop and single loop MCPR operating limits are the same.

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since TS 3.2.2 above the dotted line information does not mention reduced core flow therefore, the applicant believing the two loop and single loop MCPR operating limits are the same.

36. 295001AK1.03 001

References provided to the applicant:

NONE

K/A:

APE: 295001 Partial or Complete Loss of Forced Core Flow Circulation

AK1. Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : (CFR: 41.8 to 41.10)

AK1.03 †Thermal limits 3.6 4.1

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-B31-RRS-LP-00401, Reactor Recirculation System, **Ver. 12.0**, EO 300.006.A.25

Reference(s) used to develop this question:

Unit 2 TS 3.4.1, Recirculation Loops Operating, **Amendment 182**
Unit 2 TS 3.2.2 MINIMUM CRITICAL POWER RATIO (MCPR), **Amendment 210**

Bank question from HLT data base. Q# 295001AK1.03-001

37. 295003G2.2.39 001/30005TS/300.006.A.26/NEW/TECH SPECS/BOTH/295003G2.2.39/1/1/F/2/ARB/ABG

Unit 1 and **2** are operating at 100% RTP with all 4KV busses normally aligned.

A transformer fire and fault occurs on Startup Auxiliary Transformer (SAT) 1C and all automatic actions associated with the transformer fault occur as expected.

Based on the above conditions and IAW TS 3.8.1 AC Sources - Operating,

The FIRST performance of 34SV-SUV-013-0, Weekly Breaker Alignment Checks, is REQUIRED to be completed NO LATER THAN __________ from entry into the Required Action Statement (RAS).

A. 15 minutes

B. 20 minutes

C. 30 minutes

D.✓ 60 minutes

37. 295003G2.2.39 001

Description:

TS 3.1.5 Control Rod Scram Accumulators, completion time for Two or more control rod scram accumulators inoperable with reactor steam dome pressure $\geq$ 900 psig is 20 minutes.

LCO 3.4.9 RCS pressure, RCS temperature, and RCS heatup and cooldown rates, completion time for restoring parameters is 30 minutes.

TS 3.4.10 Reactor Steam Dome Pressure, completion time for restoring Reactor steam dome pressure within limit is 15 minutes.

3.8.1 AC Sources - Operating, completion time for performing the initial Weekly Breaker Alignment Checks is 60 minutes (1 hour).

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the one hour action statement from TS 3.8.1 for performance of the Weekly Breaker Alignment Checks due to a partial loss of AC power supply.

The "A"distractor is plausible since 15 minutes is TS 3.4.10 Reactor Steam Dome Pressure, completion time for Reactor steam dome pressure not within limit.

The "B" distractor is plausible since 20 minutes is TS 3.1.5, completion time for Two or more control rod scram accumulators inoperable with reactor steam dome pressure $\geq$ 900 psig.

The "C"distractor is plausible since 30 minutes is TS 3.4.9 RCS Pressure and Temperature (P/T) Limits, completion time for RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

"D" is Correct.

37. 295003G2.2.39 001

References provided to the applicant:

NONE

K/A:

APE: 295003 Partial or Complete Loss of A.C. Power

G2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13) 3.9 4.5

LESSON PLAN/OBJECTIVE:

LT-LP-30005, Technical Specifications, **Ver. 10.8**, EO 300.006.A.26

Reference(s) used to develop this question:

Unit 1 TS 3.1.5 Control Rod Scram Accumulators, **Amendment 195**
Unit 1 TS 3.4.9 RCS Pressure and Temperature (P/T) Limits, **Amendment 277**
Unit 1 TS 3.4.10 Reactor Steam Dome Pressure, **Amendment 277**
Unit 1 TS 3.8.1 AC Sources - Operating, **Amendment 279**

38. 295004AK3.02 001/02704R42/H-OP-90000.001/MOD/P-AB/BOTH/295004AK3.02/1/1/H/2/ARB/ABG

Unit 1 is operating at 100% RTP when the following occurs:

- o 125/250V BATTERY GND FAULT, 651-141, ILLUMINATED
- o 34AB-R42-001-0, Location Of Grounds, is entered
- o The magnitude of the ground is determined to be 23,000 OHMS

Subsequently, the NPO places the Ground Detection Sys Battery meter switch in the position which clears the alarm.

Based on the above conditions,

Actions to locate and isolate grounds are REQUIRED because __________ .

34AB-R42-001-0 __________ be EXITED at this time.

A. a single ground frequently results in spurious equipment operation;
can

B. a single ground frequently results in spurious equipment operation;
can NOT

C.✔ personnel or equipment hazards could occur if a second ground develops;
can

D. personnel or equipment hazards could occur if a second ground develops;
can NOT

38. 295004AK3.02 001

Description:

IAW 34AR-651-141-1:

Corrective action for any ground must be initiated immediately to avoid possible personnel and equipment safety hazard if a second ground were to occur.

IAW 34AB-R42-001-0, Location Of Grounds:

IF ground is **greater than 19000 ohms** (toward 50000 ohms), place the Ground Detection Sys Battery meter switch in the position which clears the alarm, AND **exit this procedure**.

IF ground is less than 19000 ohms (toward 0 ohms):

IF possible, PLACE the Ground Detection Sys Battery meter switch in the position which clears the alarm.

Locate the ground per the following subsections.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to know that actions to locate and isolate a ground fault are required when the magnitude is less than 19000 ohms and the reason those actions are performed.

The "A" distractor is plausible because a single ground could result in spurious equipment operation with use of a low resistance ground detection system. The second part is correct.

The "B" distractor is plausible because a single ground could result in spurious equipment operation with use of a low resistance ground detection system. The second part is plausible because a ground does exist but actions to locate and isolate the ground are not required.

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible because a ground does exist but actions to locate and isolate the ground are not required.

38. 295004AK3.02 001

References provided to the applicant:

NONE

K/A:

APE: 295004 Partial or Complete Loss of D.C. Power

AK3. Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : (CFR: 41.5 / 45.6)

AK3.02 Ground isolation/fault determination 2.9 3.3

LESSON PLAN/OBJECTIVE:

H-NL-LP-R42-ELECT-02704, DC Electrical Distribution, **Ver. 11.0,** LO H-OP-90000.001

Reference(s) used to develop this question:

34AB-R42-001-0, Location Of Grounds, **Ver. 1.3**
34AR-651-141-1, 125/250V BATTERY GND FAULT, **Ver. 2.0**
Modified from HLT Database which was used on 2017 Hatch NRC Exam Q#40

ORIGINAL QUESTION

Unit 2 is operating at 100% RTP when the following alarm occurs:

o 125/250V BATTERY GND FAULT, 651-127

IAW 34AB-R42-001-0, Location Of Grounds and 34AR-651-127-2, Actions to locate and isolate the ground are REQUIRED if the magnitude of the ground is __________ .

The above actions are REQUIRED because __________ .

A. 8,000 OHMS;
a single ground frequently results in spurious equipment operation

B.✓ 8,000 OHMS;
personnel or equipment hazards could occur if a second ground develops

C. 22,000 OHMS;

a single ground frequently results in spurious equipment operation

D. 22,000 OHMS;
personnel or equipment hazards could occur if a second ground develops

39. 295005AA1.05 001/01701N30/H-OP-90000.004/NEW/P-NORM/BOTH/295005AA1.05/1/1/F/3/ARB/ABG

Unit 2 was operating at 100% RTP when the Main Turbine received a spurious trip signal.

ONLY RC-1 has been completed.

The following Main Turbine valves responded as designed:

- o Stop valves
- o Control valves
- o Intermediate Stop valves
- o Intercept valves

Based on the above conditions and IAW 34SO-N30-001-2, Main Turbine Operation,

ALL of the above listed valves __________ be CLOSED.

AFTER RPV pressure stabilizes, RPV pressure will be controlled by operating __________ valves.

A. will;
Low-Low Set

B✔ will;
Main Turbine Bypass

C. will NOT;
Low-Low Set

D. will NOT;
Main Turbine Bypass

39. 295005AA1.05 001

Description:

ISV	Intermediate Stop Valve
IV	Intermediate Control Valve
TCV	Turbine Control Valve
TSV	Turbine Stop Valve

Upon a Turbine trip, the EHC System will:

a. Actuate fast acting solenoids for **closure** of the following valves:
   1) TSV
   2) TCV
   3) **Combined Intermediate**, (ISV & IV)
   4) Extraction Non-Return Check

When CLOSE VALVES is selected, the Speed Reference signal is negative, forcing the TSVs, TCVs and IVs closed. IVs remain open.

LLS - 4 SRVs are armed, and then cycle as follows

A. Armed:

(1) Reactor Pressure greater than 1074 PSIG
(2) Any Tailpipe pressure greater than or equal to 85 PSIG

B. Cycle

Valve	Open	Close
1) 2B21-F013B	997	851
2) 2B21-F013G	1012	866
3) 2B21-F013F	1027	881
4) 2B21-F013D	1036	890

Bypass valves will reopen and control RPV pressure with pressure set at 945 psig leaving the LLS valves closed and not reopening.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the intermediate valve (turbine pressure regulating system) response to a turbine trip and the monitoring either DEHC (monitor turbine pressure regulating system) or LLS for controlling RPV pressure.

The "A" distractor is plausible since the first part is correct. The second part is plausible since LLS armed and lowered RPV pressure but when RPV pressure stabilizes, all LLS valves will be closed due to RPV pressure being maintained below the LLS opening setpoint.

"B" is Correct.

The "C" distractor is plausible since there are times when one part of the CIV (Intercept valve) does not close with the other valves such as when the "Close Valves" button is depressed. The second part is plausible since LLS armed and lowered RPV pressure but when RPV pressure stabilizes, all LLS valves will be closed due to RPV pressure being maintained below the LLS opening setpoint.

The "D" distractor is plausible since there are times when one part of the CIV (Intercept valve) does not close with the other valves such as when the "Close Valves" button is depressed. The second part is plausible since it is correct.

39. 295005AA1.05 001

References provided to the applicant:

NONE

K/A:

APE: 295005 Main Turbine Generator Trip

AA1. Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP : (CFR: 41.7 / 45.6)

AA1.05 Reactor/turbine pressure regulating system 3.6 3.6

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-N30-MTA-01701, Main Turbine, **Ver. 11.0**, LO H-OP-90000.004
H-LT-NL-LP-B21-SLLS-01401, Main Steam and Low Low Set, **Ver. 11.2**, EO 014.003.A.05

Reference(s) used to develop this question:

34SO-N30-001-2, Main Turbine Operation, **Ver. 28.4**

40. 295006AA2.02 001/20304TERMS/201.093.A.11/MOD/P-AB/BOTH/295006AA2.02/1/1/H/3/ARB/ABG

Unit 2 was at 30% RTP when a spurious reactor scram occurred.

NO EOP Flowchart Entry conditions exist.

ALL Control Rods fully inserted with the following EXCEPTIONS:

Control Rod	Position
26-31	02
26-23	02
22-35	02
22-27	02
50-27	48

34AB-C11-005-2, Control Rod Insertion Methods, is entered to insert the above Control Rods to position 00.

Based on the above conditions,

Based on the above rod positions, the reactor __________ in a Cold Shutdown Rod Configuration.

IAW 34AB-C11-005-2, ALL automatic scram signals __________ ALLOWED to be BYPASSED.

A. is;
are

B. is;
are NOT

C. is NOT;
are

D.✓ is NOT;
are NOT

40. 295006AA2.02 001

Description:

Cold Shutdown rod configuration means that all rods are fully inserted with the highest worth control rod being fully withdrawn OR ALL rods at or past position "02".

RWM Shutdown Confirmation criteria - if all rods are at or inserted past position 02 then shutdown is confirmed. If the 10 rods were at position 02, the reactor will remain shutdown under all conditions. If one of the rods listed was at a position other than 02 (position 48), then shutdown confirmation would not be confirmed. 34AB-C11-005-2 does not allow bypassing the auto scram signals to insert rods. This is only found in 31EO-EOP-103-2.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to interpret control rod positions to determine if a cold shutdown rod confirguration exists after a reactor scram.

The "A" distractor is plausible because only one control rod is not at position 00 or 02, therefore a cold shutdown rod configuration exists. The second part is correct.

The "B" distractor is plausible because only one control rod is not at position 00 or 02, therefore a cold shutdown rod configuration exists. The second part is plausible because if control rods are inserted to at least position 02, EOP-103 is NOT entered, therefore all auto scrams are not allowed to be bypassed.

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible because if control rods are inserted to at least position 02, EOP-103 is NOT entered, therefore all auto scrams are not allowed to be bypassed.

40. 295006AA2.02 001

References provided to the applicant:

NONE

K/A:

APE: 295006 SCRAM

AA2. Ability to determine and/or interpret the following as they apply to SCRAM :
(CFR: 41.10 / 43.5 / 45.13)

AA2.02 Control rod position 4.3* 4.4*

LESSON PLAN/OBJECTIVE:

EOP-TERMS-LP-20304, EOP Terms & Definitions, **Ver. 3.3**, EO 201.093.A.11.h

References used to develop this question:

34GO-OPS-065-0, Control Rod Movement, **Ver. 15.0**
Modified from HLT Database which was used on HLT-10 2016 NRC Exam Q#40

ORIGINAL QUESTION

Unit 2 was at 100% RTP when a spurious reactor scram occurred.

ALL Control Rods fully inserted with the following EXCEPTIONS:

Control Rod	Position	Control Rod	Position
26-31	02	10-27	02
26-23	02	30-11	02
22-35	02	30-47	02
22-27	02	46-19	02
50-27	02	02-31	02

Based on the above conditions,

Based ONLY on the current rod positions, the reactor __________ in a Cold Shutdown Rod Configuration.

IAW Plant Procedures, ALL automatic scram signals __________ ALLOWED to be BYPASSED.

A. is;
are

B.✓ is;
are NOT

C. is NOT;
are

D. is NOT;
are NOT

41. 295007AK1.03 001/01001C71/H-OP-90000.003/MOD/P-AB/BOTH/295007AK1.03/1/2/H/2/ARB/ABG

A reactor startup is being performed on **Unit 1** with the following conditions:

o Rx Mode Switch position		STARTUP/HOT STBY
o Rx power:	IRM Indication	35 on Range 10
	APRM indication	7%

Subsequently, the following occurs:

- o 2B21-F022A-D, INBOARD MSIVs, fail CLOSE

Based on the above conditions,

Reactor power will INITIALLY __________ .

IAW REACTOR AUTO SCRAM SYSTEM A TRIP, 603-117, the FIRST listed reactor scram signal that will be received is from __________ .

A✓ go up;
APRMs

B. go up;
MSIVs

C. go down;
APRMs

D. go down;
MSIVs

41. 295007AK1.03 001

Description:

When Reactor pressure goes up, the pressure collapses bubbles and inserts positive reactivity by improving neutron moderation. On other hand, any reduction in pressure below saturation temperature results in increased core void fraction and insertion of negative reactivity.

RPS Scram Setpoints

1. Reactor Vessel Low Water Level; Plant setpoint: 3" inches above instrument zero.
2. Reactor Vessel High Pressure, Plant Setpoint: 1074 psig
3. Scram Discharge Volume High Water Level, Plant Setpoint: 57 gal (Unit 1: 63 gal)
4. Drywell High Pressure, Plant Setpoint: 1.85 psig
5. **Main Steam Isolation Valve (MSIV) Closure, Plant Setpoint: 90% full open**
6. Turbine Stop Valve (TSV) Closure, Plant Setpoint: 90% full open
7. Turbine Control Valve (TCV) Fast Closure, Plant Setpoint: 670 psig electro-hydraulic trip (EHC) oil pressure
8. Neutron Monitoring System, Plant Setpoints:
   IRM high-high; 115/125 divisions of full scale
   APRM high-high (not in run); 13%
   APRM Upscale Thermal Trip (flow-biased);
   0.57w + 53% -0.57 w, clamped at 112.5%
   APRM high-high (fixed); 117%
   OPRM Trip - amplitude based algorithm, or
   growth based algorithm, or
   period based algorithm.
9. Initial Fuel Loading Trips, Plant Setpoints:
   SRM high-high; 3x105 cps
   IRM high-high; 115/125 divisions of full scale
   APRM high-high (startup); 13%
   APRM Upscale Thermal Trip (flow-biased)
   0.57w + 53% -0.57 w, clamped at 112.5%
   APRM high-high (fixed); 117%
10. Manual Scram Pushbuttons
11. Reactor Mode Switch to Shutdown (Manual Scram)

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the pressure effect on reactor power as reactor pressure rises to above the normal value for the startup condition and how this effect will be terminated (APRMs).

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since this is a scram signal and would be correct if the reactor mode switch was in the RUN position.

The "C"distractor is plausible since reactor power would initially go down due to the MSIV not full open scram signal. The second part is plausible since it is correct.

The "D"distractor is plausible since reactor power would initially go down due to the MSIV not full open scram signal. The second part is plausible since this is a scram signal and would be correct if the reactor mode switch was in the RUN position.

41. 295007AK1.03 001

References provided to the applicant:

NONE

K/A:

APE: 295007 High Reactor Pressure

AK1. Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE : (CFR: 41.8 to 41.10)

AK1.03 Pressure effects on reactor power 3.8 3.9

LESSON PLAN/OBJECTIVE:

C71-RPS-LP-01001, RPS, **Ver. 9.3**, LO H-OP-90000.003

Reference(s) used to develop this question:

34AR-603-117-1, REACTOR AUTO SCRAM SYSTEM A TRIP, **Ver. 6.1**
Modified for Hatch from question used on 2003 Perry NRC Exam Q#3

ORIGINAL QUESTION

The plant is operating at 70% power when Inboard MSIV, B21-F022A, unexpectedly closes.

- o The reactor does not scram.
- o Reactor pressure increases 20 psig and stabilizes.
- o No operator actions are taken.

Which one of the following describes the response of the reactor to this event?

A. Reactor power initially decreases and then stabilizes at a lower value.

B. Reactor power initially decreases and then returns to its original value.

C.✓ Reactor power initially increases and then stabilizes at a higher value.

D. Reactor power initially increases and then returns to its original value.

42. 295008AK3.02 001/LT-LP-20201/LT-20201.019/NEW/P-AB/BOTH/295008AK3.02/1/2/H/3/ARB/ABG

Unit 2 is operating at 22% RTP when the following occurs:

- o 2C32-R600, Master Feedwater Controller, OUTPUT signal fails UPSCALE
- o RWL peaks at 58 inches

As the above transient progresses and with NO Operator actions,

A FULL Reactor scram will FIRST occur when the __________ alarm is received.

A. REACTOR VESSEL HIGH PRESSURE TRIP, 603-105

B.✓ REACTOR VESSEL LOW LEVEL TRIP, 603-108

C. TURB STOP VLV CLOSURE TRIP, 603-103

D. MSIVS NOT FULL OPEN TRIP, 603-104

42. 295008AK3.02 001

Description:

Bruno, this was a Pre-submittal RO question. Changes were incorporated based on your ES-401-9 comments.

IAW REACTOR VESSEL HIGH PRESSURE TRIP, 603-105;

2.0 CONDITION:

Reactor vessel pressure is at OR above the scram setpoint 1074 PSIG increasing.

IAW REACTOR VESSEL LOW LEVEL TRIP, 603-108;

2.0 CONDITION:

Reactor vessel water level is at OR below the scram setpoint +3 inches decreasing.

IAW TURB STOP VLV CLOSURE TRIP, 603-103;

2.0 CONDITION:

Main Turbine Stop Valve is NOT fully OPEN.

Scram signal bypassed with reactor power <27.6% RTP.

IAW MSIVS NOT FULL OPEN TRIP, 603-104;

2.0 CONDITION:

Alarm indicates that MSIVs are not fully OPEN with the Mode Switch in RUN.

6.0 CAUSES:

6.1 Any three main steam lines isolated will cause a direct scram and alarm.

NOTE: Due to a rapid reactor pressure and flux rise, a scram is very probable upon isolating any main steam line during power operation

IAW 34SO-N21-007-2, Condensate and Feedwater System,

5.2.4 Any of the following conditions will automatically trip a Reactor Feed Pump:

5.2.4.2 Reactor vessel level greater than 54.0 inches

IAW 34SO-N30-001-2, Main Turbine Operation,

5.2.15 The following electrical signals will trip the turbine:

5.2.15.3 High reactor level 54 inches

H-LT-NL-LP-B21-SLLS-01401, Main Steam and Low-Low-Set,

The Group I isolation logic is powered by RPS. Automatic closure of the MSIVs and the Main Steam Line Drains occur on any of the following conditions (PCIS Group I):

f. Rx Pressure low at 855 (Unit 1 850) psig with the Reactor mode switch in RUN.

When RWL raised to 58 inches the RFPs and Main Turbine will trip on High RWL (54 inches). The Turbine Stop valves will go close (603-103) and would initiate a scram if RTP was greater than 27.6% RTP. Once the RFPs trip RWL lowers to +3 inches (603-108) the reactor will scram. RWL will continue to go down and at -35 inches HPCI and RCIC will auto start and begin to inject. The cool torus water injection will cause RPV Pressure to lower. When RPV Pressure lowers to 855 psig the MSIVs will go close (603-104) due to operator not taking the MODE

SWITCH out of RUN. The MSIVs closure will cause a RPV pressure spike (603-105).

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know the cause of the reactor scram based on a high RWL condition event, therefore the applicant knowing the reason for the reactor scram.

The "A"distractor is plausible since it is a SCRAM condition just not the first one to occur.

"B" is Correct.

The "C" distractor is plausible since this would be correct if RTP was greater than 27.6%.

The "D"distractor is plausible since it is a SCRAM condition just not the first one to occur.

42. 295008AK3.02 001

References provided to the applicant:

NONE

K/A:

APE: 295008 High Reactor Water Level

AK3. Knowledge of the reasons for the following responses as they apply to HIGH REACTOR WATER LEVEL : (CFR: 41.5 / 45.6)

AK3.02 Reactor SCRAM: Plant-Specific 3.6* 3.9*

IAW CHIEF EXAMINER BRUNO CABALLERO, THE BELOW K/A WAS REPLACED WITH THE ABOVE K/A ON 1/18/2019.

AK3. Knowledge of the reasons for the following responses as they apply to HIGH REACTOR WATER LEVEL : (CFR: 41.5 / 45.6)

AK3.07 HPCS isolation: Plant-Specific 3.2 3.3

LESSON PLAN/OBJECTIVE:

LT-LP-20201, Introduction To Abnormal Procedures, **Ver. 12.2**, LO LT-20201.019
H-LT-NL-LP-B21-SLLS-01401, Main Steam and Low-Low-Set, **Ver. 11.2**

Reference(s) used to develop this question:

34A-603-103, TURB STOP VLV CLOSURE TRIP, **Ver. 3.3**
34AR-603-104-2, MSIVS NOT FULL OPEN TRIP, **Ver. 3.1**
34AR-603-105-2, REACTOR VESSEL HIGH PRESSURE TRIP, **Ver. 4.2**
34AR-659-018-2, REACTOR VESSEL LOW LEVEL TRIP, **Ver. 3.3**
34SO-N21-007-2, Condensate and Feedwater System, **Ver. 55.1**
34SO-N30-001-2, Main Turbine Operation, **Ver. 28.5**

43. 295010G2.2.22 001/01301PC/300.009.A.06/BANK/TECH SPECS/BOTH/295010G2.2.22/1/2/H/2/ARB/ABG

Unit 2 is operating at 90% RTP.

- o Drywell pressure is 0.5 psig
- o At 10:00, DW pressure begins going up at 0.05 psig/minute

Based on the above conditions and IAW Tech Spec Limiting Condition for Operation (LCO) 3.6.1.4, Drywell Pressure, which ONE of the following completes the following statements?

The EARLIEST listed time that REQUIRES entry into a Required Action Statement (RAS) based on Drywell pressure is __________ .

Drywell pressure is REQUIRED to be restored to within limit NO later than __________ from entering the RAS.

A. 10:03;
fifteen (15) minutes

B. 10:03;
one (1) hour

C. 10:26;
fifteen (15) minutes

D✓ 10:26;
one (1) hour

43. 295010G2.2.22 001

Description:

TS LCO for DW pressure is ≤ 1.75 psig, and if it is not, restore it to below 1.75 psig within 1 hour (TS 3.6.1.4).

15 minutes is the RAS for Steam Dome Pressure (TS 3.4.10)

10:03 corresponds to 0.65 psig,
10:26 corresponds to 1.8 psig which exceeds the LCO of ≤1.75 psig

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant when Drywell Pressure exceeds the LCO for Drywell Pressure.

The "A" distractor is plausible since Drywell pressure at this time corresponds to the alarm setpoint for the Primary Containment Pressure High, 34AR-603-115-2, annunciator. The second part is plausible since 15 minutes is the TS RAS for steam dome pressure.

The "B" distractor is plausible since Drywell pressure at this time corresponds to the alarm setpoint for the Primary Containment Pressure High, 34AR-603-115-2, annunciator. The second part is plausible since it is correct.

The "C"distractor is plausible since the first part is correct. The second part is plausible since 15 minutes is the TS RAS for steam dome pressure.

"D" is Correct.

43. 295010G2.2.22 001

References provided to the applicant:

NONE

K/A:

APE: 295010 High Drywell Pressure

G2.2.22 Knowledge of limiting conditions for operations and safety limits.
(CFR: 41.5 / 43.2 / 45.2). 4.0 4.7

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T23-PC-01301, Primary Containment, **Ver. 9.0**, EO 300.009.A.06

Reference(s) used to develop this question:

Unit 2 Tech Spec 3.4.10, Reactor Steam Dome Pressure, **Amendment 221**
Unit 2 Tech Spec 3.6.1.4, Drywell Pressure, **Amendment 210**
Bank question from HLT Database which was used on 2009 HLT-4 Hatch NRC Exam Q#42

44. 295014AA1.07 001/01501MSRFW/H-OP-90000.004/MOD/P-AB/BOTH/295014AA1.07/1/2/H/3/ARB/ABG

Unit 2 is operating at 100% RTP.

A transient occurs resulting in feedwater temperature LOWERING.

- o NPO enters 34AB-N21-001-2, Loss of Feedwater Heating

Based on the above conditions,

IAW 34AB-N21-001-2, the Immediate Operator Action is to depress the __________ .

Final Feedwater temperatures will be monitored on Panel __________ .

A. Individual Recirc Flow Control LOWER FAST pushbuttons;
2H11-P650

B. Individual Recirc Flow Control LOWER FAST pushbuttons;
2H11-P656

C✔ Master Recirc Flow Control LOWER FAST pushbutton;
2H11-P650

D. Master Recirc Flow Control LOWER FAST pushbutton;
2H11-P656

44. 295014AA1.07 001

Description:

IAW 34AB-N21-001-2 step 3.1 states "Maintain Reactor power BELOW the **steady state power level prior to the feedwater temperature reduction**, via recirc, using the **Master Recirc Flow Control LOWER FAST pushbutton**, OR as specified on the shift reactivity briefing sheet."

Feedwater temperature is indicated on recorder 2N21-R608, on Panel 2H11-P650. Panel 2H11-P656 contains numerous Feedwater heater level annunciators which could be indicative of a Feedwater temperature transient.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the action to take (operate) to mitigate the cold water injection and where to monitor Feedwater injection temperature (cold water injection).

The "A" distractor is plausible since the Individual Recirc Flow Control LOWER FAST pushbuttons will reduce recirc speeds but are not required to be used IAW 34AB-N21-001-2. The second part is plausible since it is correct.

The "B" distractor is plausible since the Individual Recirc Flow Control LOWER FAST pushbuttons will reduce recirc speeds but are not required to be used IAW 34AB-N21-001-2. The second part is plausible since this panel contains various Feedwater Heater level alarms.

"C" is Correct.

The "D"distractor is plausible since the first part is correct. The second part is plausible since this panel contains various Feedwater Heater level alarms.

44. 295014AA1.07 001

References provided to the applicant:

NONE

K/A:

APE: 295014 Inadvertent Reactivity Addition

AA1. Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION: (CFR: 41.7 / 45.6)

AA1.07 Cold water injection 4.0 4.1

LESSON PLAN/OBJECTIVE:

N22-MSRFW-LP-01501, MSRs and Feedwater Heaters, **Ver. 7.0,** EO H-OP-90000.004

Reference(s) used to develop this question:

34AB-N21-001-2, Loss of Feedwater Heating, **Ver. 8.0**
Modified from HLT Database which was used on 2015 Hatch NRC Exam Q#75

ORIGINAL QUESTION

Unit 2 is at 100% RTP when a loss of Feedwater Heating event occurs.

IAW 34AB-N21-001-2, Loss Of Feedwater Heating,

The Immediate Operator Action is to depress the __________ .

The feedwater temperatures (4) shown on SPDS __________ to determine Final Feedwater Temperature.

A. Individual Recirc Flow Control LOWER FAST pushbuttons;
can be read directly

B. Individual Recirc Flow Control LOWER FAST pushbuttons;
must be averaged

C.✓ Master Recirc Flow Control LOWER FAST pushbutton;
can be read directly

D. Master Recirc Flow Control LOWER FAST pushbutton; must be averaged

45. 295016AK2.01 001/05201RSDP/039.016.A.01/MOD/P-AB/BOTH/295016AK2.01/1/1/F/3/ARB/ABG

The control room has been abandoned and 31RS-OPS-001-2, Shutdown From Outside Control Room, is being implemented.

All **Unit 2** Remote Shutdown Panel Transfer Switches have been placed in the EMERGENCY position.

Based on the above conditions and IAW 31RS-OPS-001-2, which ONE of the following completes these statements?

RCIC __________ AUTOMATICALLY start on low RWL.

RCIC Steam Supply valve, 2E51-F045, __________ AUTOMATICALLY close on high RWL.

A. will NOT;
will

B.✓ will NOT;
will NOT

C. will;
will

D. will;
will NOT

45. 295016AK2.01 001

Description:

When the Remote Shutdown Panel Transfer Switches for RCIC are in EMERGENCY, the RCIC Turbine automatic start on low RPV level is **disabled**. All of the automatic and manual RCIC turbine trips are still **operable** when operating from the RSDP. The trips are as follows:

1) Manual push-button MCR
2) High Turbine Exhaust Pressure
3) Low RCIC Pump Suction Pressure
4) Mechanical Overspeed - (125%)
5) RCIC Logic A or Logic B Isolation Signal
6) Local Manual Trip

Automatic closure of 2E51-F045, Steam to Turbine Vlv, on Reactor Vessel High Level is disabled with the transfer switches in emergency.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the RCIC RSDP response (interrelations) when control of RCIC has been transferred from the Control Room to the RSDP.

The "A" distractor is plausible since the first part is correct. The second part is plausible since some of the other automatic trips are still operational and will trip RCIC.

"B" is Correct.

The "C"distractor is plausible since there are other automatic functions that will still occur for RCIC from the RSDP. The second part is plausible since some of the other automatic trips are still operational and will trip RCIC.

The "D"distractor is plausible since there are other automatic functions that will still occur for RCIC from the RSDP. The second part is plausible since it is correct.

45. 295016AK2.01 001

References provided to the applicant:

NONE

K/A:

APE: 295016 Control Room Abandonment

AK2. Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: (CFR: 41.7 / 45.8)

AK2.01 Remote shutdown panel: Plant-Specific 4.4* 4.5*

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-C82-RSDP-05201, Remote Shutdown Panel (RSDP), **Ver. 6.0**, EO 039.016.A.01

Reference(s) used to develop this question:

31RS-OPS-001-2, Shutdown From Outside Control Room, **Ver. 7.1**
Modified from HLT Database which was used on the 2007 Hatch NRC Exam Q#47

ORIGINAL QUESTION

The control room has been abandoned and 31RS-OPS-001-2, Shutdown From Outside Control Room, is being implemented. All RSDP transfer switches have been placed in the EMERGENCY position.

Which ONE of the following will correctly complete the statement below for water level control using RCIC?

> At the **Unit 2** remote shutdown panel, if reactor water level decreases to -35 inches RCIC ___________ automatically start. If reactor water level increases to 52 inches RCIC Steam Supply valve, 2E51-F045, ____________ automatically close.

A. will / will

B. will / will NOT

C. will NOT / will

D.✓ will NOT / will NOT

46. 295017AK3.01 001/01401B21/200.098.A.01/BANK/P-AB/BOTH/295017AK3.01/1/2/H/3/ARB/ABG

Unit 1 is operating at 18% RTP.

The following alarms are received soon after a cold water injection into the reactor:

- o MAIN STEAM LINE RADIATION HIGH, 601-425
- o MAIN STEAM LINE RADIATION HIGH-HIGH/INOP, 603-125
- o Main Steam Line radiation levels are 6000 mR/hr and rising
- o Crew suspects fuel element failure

A NPO responding to the above conditions, observes the following valve positions:

- o 1B21-F022A-D & 1B21-F028A-D, MSIVs, OPEN
- o 1B31-F019 & 1B31-F020, Reactor Recirculation Sample Valves, OPEN

Based on the above conditions and IAW 34AB-B21-001-1, Main Steam Line High Radiation or Suspected Fuel Element Failure,

ALL automatic actions __________ occurred and the NPO is REQUIRED to __________ .

A. have;
perform a fast reactor shutdown IAW 34GO-OPS-014-1, Fast Reactor Shutdown, and then close the MSIVs

B. have;
scram the reactor and then close the MSIVs

C. have NOT;
perform a fast reactor shutdown IAW 34GO-OPS-014-1, Fast Reactor Shutdown, and then close the MSIVs

D.✓ have NOT;
scram the reactor and then close the MSIVs

46. 295017AK3.01 001

Description:

IAW 603-125-1, the Recirc Sample valves auto close when MSL rad monitors exceed 2.5 x normal if RTP is <20%. The MSIV auto closure at this setpoint is no longer applicable at Plant Hatch. If it is suspected that the cause of this alarm is Fuel Element Failure (FEF), 34AB-B21-001-1 requires the reactor be scrammed, auto actions confirmed and MSIVs closed.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant if a total system isolation has occurred and then the subsequent isolation of the MSIVs to limit the off-site release rate (reason) based on an Abnormal procedure.

The "A" distractor is plausible since the Group 1 Sample valves, auto isolation on MSL Radiation monitors exceeding 2.5 x normal, is set to 1 Million mr/hr when >20% RTP and no valve movement occurs. The second part because a Fast Reactor Shutdown is the required action if the cause of the alarms is NOT suspected to be FEF -or- only if the MSL Rad High alarm is received when FEF is suspected.

The "B" distractor is plausible since the Group 1 Sample valves, auto isolation on MSL Radiation monitors exceeding 2.5 x normal, is set to 1 Million mr/hr when >20% RTP and no valve movement occurs. With Rx power <20% RTP, the Group 1 Sample vavles should have isolated. The second part is correct.

The "C" distractor is plausible since the first part is correct and the second part because a Fast Reactor Shutdown is the required action if the cause of the alarms is NOT suspected to be FEF -or- only if the MSL Rad High alarm is received when FEF is suspected.

"D" is Correct.

46. 295017AK3.01 001

References provided to the applicant:

NONE

K/A:

APE: 295017 High Off-Site Release Rate

AK3. Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE : (CFR: 41.5 / 45.6)

AK3.01 System isolations 3.6 3.9

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-B21-SLLS-01401, Main Steam and Low Low Set, **Ver. 11.2** EO 200.098.A.01

Reference(s) used to develop this question:

34AB-B21-001-1, Main Steam Line High Radiation or Suspected Fuel Element Failure, **Ver. 5.2**
34AR-601-425-1, MAIN STEAM LINE RADIATION HIGH, **Ver. 4.4**
34AR-603-125-1, MAIN STEAM LINE RADIATION HIGH-HIGH/INOP, **Ver. 3.1**

Bank question from HLT Database which was used on 2011 Hatch HLT-6 NRC Exam Q#34.

47. 295018AK3.02 001/P42-RBCCW-00901/H-OP-90000.004/NEW/P-AB/BOTH/295018AK3.02/1/1/H/3/ARB/ABG

Unit 2 is operating at 100% RTP when the following occurs:

At 11:00, first RBCCW pump trips
(Start attempt FAILED)

At 11:05, second RBCCW pump trips
(Start attempt FAILED)

At 11:10, 2G31-C001B, RWCU Sealless Pump, motor temperature is 142°F

At 11:15, ASD B FATAL FAULT, 602-202, ILLUMINATES

At 11:20, third RBCCW pump trips
(Start attempt FAILED)

Based on the above conditions and IAW 34AB-P42-001-2, Loss of RBCCW,

The EARLIEST listed time that entry into 34AB-C71-001-2, Scram Procedure, is REQUIRED is __________ .

A.✓ 11:05

B. 11:10

C. 11:15

D. 11:20

47. 295018AK3.02 001

Description:

At 11:10,

2.1 2G31-C001B, Reactor Water Cleanup Sealless Pump, **will TRIP** on high motor temperature of 140°F.

At 11:05,

4.9 IF only one RBCCW pump is running, perform the following:

4.9.1 **Enter 34AB-C71-001-2**, Scram Procedure AND SCRAM the reactor.

At 11:15;

4.7 IF any of these conditions exist,

- o RBCCW flow CANNOT be re-established,
- o RBCCW suction temperature reaches **105°F** as indicated on 2P42-R600, 2H11-P650,
- o **any temperature on Recirc System reaches its alarm setpoin**t **(**602-202, Stpt. Power Cell Outlet Temp Very High >140°F AND Inlet Temp High >140°F).

Then perform the following:

4.7.1 **Enter 34AB-C71-001-2**, Scram Procedure, AND SCRAM the reactor.

At 11:20;

4.2 IF no RBCCW pumps can be started, **enter 34AB-C71-001-2**, Scram Procedure, AND SCRAM the reactor.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine when (reason) a reactor shutdown (power reduction) is required based upon system parameters (partial loss of component cooling) and the Abnormal procedure.

"A" is correct.

The "B" distractor is plausible since this is an automatic system load trip and indicating a problem with the RBCCW System loads, therefore, entering scram procedure to reduce loading.

The "C" distractor is plausible since this is an entry condition to enter the scram procedure, just not the earliest.

The "D" distractor is plausible since this is an entry condition to enter the scram procedure, just not the earliest.

47. 295018AK3.02 001

References provided to the applicant:

NONE

K/A:

APE: 295018 Partial or Complete Loss of Component Cooling Water

AK3. Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : (CFR: 41.5 / 45.6)

AK3.02 Reactor power reduction 3.3 3.4

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-P42-RBCCW-00901, Reactor Building Closed Cooling Water, **Ver. 4.0**,
LO H-OP-90000.004

Reference(s) used to develop this question:

34AB-P42-001-2, Loss Of Reactor Building Closed Cooling Water, **Ver. 2.6**

48. 295019AA1.04 001/03501P51/P70/200.025.A.01/MOD/P-AB/BOTH/295019AA1.04/1/1/F/2/ARB/ABG

Unit 2 is operating at 100% RTP when a complete (100%) rupture on the Service Air Header downstream of 2P51-F017, Service Air Isolation Valve, occurs.

- o The break is greater than the capacity of the Service Air Compressors

Based on the above conditions, IAW 34AB-P51-001-2, Loss Of Instrument And Service Air System Or Water Intrusion Into The Service Air System,

The HIGHEST listed Service Air Header pressure that will result in 2P51-F017, automatically CLOSING is __________ .

If 2P51-F017 fails to automatically close, 2P51-F017 can be manually closed using the control switch located on Panel __________ .

A. 69 psig;
2H11-P700

B✓ 69 psig;
2H11-P650

C. 79 psig;
2H11-P700

D. 79 psig;
2H11-P650

48. 295019AA1.04 001

Description:

IAW 34AB-P51-001-2:

2.1 At 80 PSIG Non-Interruptible Air Pressure, 2P52-F565, Rx Bldg Inst N_2 To Non-Int Air El. 185 Isol Vlv, OPENS to supply this header from the N_2 Inerting System.

2.3 **At 70 PSIG** Service Air Pressure, 2P51-F017, Service Air Isolation valve, CLOSES, isolating Service Air System.

4.12 On panel **2H11-P650**, confirm CLOSED/CLOSE 2P51-F017, Service Air Isolation valve notify Radiation Protection.

4.13 On panel 2H11-P700, confirm CLOSED/CLOSE 2P52-F015, Turb Bldg Inst Air After Fltrs, 2P52-D102A / 2P52-D102B, to RW Bldg Isol valve.

The pressures are reduced 1 psig below the actual setpoint.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant where to manually operate 2P51-F017, Service Air Isolation valve, in the event it fails to automatically isolate the Service Air leak.

The "A" distractor is plausible since the first part is correct. The second part is plausible since this is the panel location for manually closing 2P52-F015.

"B" is Correct.

The "C"distractor is plausible since 80 psig is the setpoint for 2P52-F565 valve opening to supply this header from the N_2 Inerting System. The second part is plausible since this is the panel location for manually closing 2P52-F015.

The "D"distractor is plausible since 80 psig is the setpoint for 2P52-F565 valve opening to supply this header from the N_2 Inerting System. The second part is plausible since it is correct.

48. 295019AA1.04 001

References provided to the applicant:

NONE

K/A:

APE: 295019 Partial or Complete Loss of Instrument Air

AA1. Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : (CFR: 41.7 / 45.6)

AA1.04 Service air isolations valves: Plant-Specific 3.3 3.2

LESSON PLAN/OBJECTIVE:

P51-P52-P70 PLANT AIR-LP-03501, Plant Air System, **Ver. 7.0**, EO 200.025.A.01

Reference(s) used to develop this question:

34AB-P51-001-2, Loss Of Instrument And Service Air System Or Water Intrusion Into The Service Air System, **Ver. 6.3**
Modified from HLT Database Q#300000K6.07-001 which was used on
Hatch 2009 NRC Exam Q#61

ORIGINAL QUESTION

Unit 2 is at 100% power with the following conditions:

- A Service Air Header break has occured
- The break is greater than the capacity of the Service Air Compressors

Which ONE of the choices below completes the following two statements?

As air pressure decreases, 2P51-F017, Turbine Building Service Air Isolation Valve, will isolate at __________ .

If 2P51-F017 fails to isolate OR pressure continues to decrease, 2P52-F015, Non-Essential Inst. Air Isolation Valve, will isolate at __________ .

A. 80 psig;
61 psig

B. 80 psig;
50 psig

C. 70 psig;
61 psig

D.✓ 70 psig;
50 psig

49. 295020AA2.06 001/01001C71/200.102.A.01/NEW/P-AB/BOTH/295020AA2.06/1/2/H/3/ARB/ABG

Unit 2 is in Mode 3 with Shutdown Cooling in service when a transient results in an inadvertent isolation of the following valves:

- o 2E11-F009, SDC Suction valve
- o 2B31-F019, Rx Water Sample valve
- o 2G11-F003, Drywell Floor Drain valve
- o 2G11-F019, Drywell Equipment Drain valve
- o 2D11-F051, Pri Cnmt Fis Prod Mon Inboard Isolation

NOTE: This is a partial list.

Based on the above conditions and IAW the associated Abnormal procedure,

The cause of the inadvertent containment isolation is a loss of __________ .

A✓ 2C71 S001A, RPS MG Set 2A

B. 2C71 S001B, RPS MG Set 2B

C. 2R25-S064, Instrument Bus 2A

D. 2R25-S065, Instrument Bus 2B

49. 295020AA2.06 001

Description:

IAW 34AB-C71-002-2, Loss of RPS Bus 2A:

Loss of RPS Bus A will result in the following Group isolation valves close::

- o 2G11-F003, Drwl Sumps Floor Drain Vlv
- o 2B31-F019, Rx Water Sample Vlv
- o 2E11-F009, SDC Suction valve
- o 2G11-F019, Drwl Sumps Equip Drain Vlv
- o 2D11-F051, Pri Cnmt Fis Prod Mon Inboard Isolation Vlv

Loss of RPS Bus B will result in the following Group isolation valves close::

- o 2G11-F004, Drwl Sumps Floor Drain Vlv
- o 2B31-F020, Rx Water Sample Vlv
- o 2E11-F008, SDC Suction valve
- o 2G11-F020, Drwl Sumps Equip Drain Vlv
- o 2D11-F052, Pri Cnmt Fis Prod Mon Outboard Isolation Vlv

IAW 34AB-R25-002-2, Loss of Instrument Bus 2A;

BREAKER 48:

1. Loss of power to **2G11-F003**, Drywell Feed Water Pump Isolation Valve and associated indicating lights on panels 2H11-P601 and 2H11-P602. This valve will close or remain closed.
2. Loss of power to **2G11-F019**, Drywell Equipment Pump Isolation Valve and associated indicating lights on panels 2H11-P601 and 2H11-P602.
3. Loss of power to **2B31-F019**, Sample Line Isolation Valve and associated indicating lights on panels 2H11-P601 and 2H11-P602. This valve will close or remain closed.

IAW 34AB-R25-002-2, Loss of Instrument Bus B;

BREAKER 17:

1. **Loss of power to 2G11-F004**, Drywell Floor Drain Pump Isolation Valve and associated indicating lights on panels 2H11-P601 and ERF signal input. This valve will close or remain closed.
2. **Loss of power to 2B31-F020**, Sample Line Isolation Valve and associated indicating lights on panels 2H11-P601 and ERF signal input. This valve will close or remain closed.
3. Loss of power to **2G11-F020**, Drywell Equipment Drain Isolation Valve, associated indicating lights on panel 2H11-P601 and ERF signal input. This valve will close or remain closed.

BREAKER 4:

12. **Loss of power to 2D11-F052**, Fission Product Monitoring Discharge Valve and associated indicating lights on panels 2H11-P601 and 2H11-P700. This valve will

close or remain closed.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine the cause (loss of RPS Bus 2A) of an inadvertent containment isolation.

"A" is Correct.

The "B" distractor is plausible since a loss of RPS Bus 2B will result in an inadvertent isolation of the outboard isolation valve in the associated line.

The "C"distractor is plausible since 2G11-F003, 2G11-F019, 2B31-F019 & 2D11-F051 will isolate when Instrument Bus 2A is lost, however, the remaining listed valve (2E11-F009) will remain open.

The "D"distractor is plausible since 2G11-F004, 2G11-F020, 2B31-F020 & 2D11-F052 will isolate when Instrument Bus 2B is lost, however, the remaining compared valve (2E11-F008) will remain open.

49. 295020AA2.06 001

References provided to the applicant:

NONE

K/A:

APE: 295020 Inadvertent Containment Isolation

AA2. Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION : (CFR: 41.10 / 43.5 / 45.13)

AA2.06 Cause of isolation 3.4 3.8

LESSON PLAN/OBJECTIVE:

C71-RPS-LP-01001, Reactor Protection System (RPS), **Ver. 9.3**, EO 200.102.A.01

Reference(s) used to develop this question:

34AB-C71-002-2, Loss of RPS, **Ver. 6.2**
34AB-R25-002-2, Loss of Instrument Buses, **Ver. 10.2**

50. 295021AK3.03 001/00701E11/H-OP-90000.004/MOD/P-AB/BOTH/295021AK3.03/1/1/H/3/ARB/ABG

Unit 2 is shutdown with RHR Loop A aligned for Shutdown Cooling with the following conditions:

o Reactor Shutdown	Two (2) days ago
o 2B21-F003, Reactor Head Vent Valve	OPEN
o 2B21-F004, Reactor Head Vent Valve	OPEN
o 2B21-F005, Reactor Manual Head Vent Valve	CLOSED

Subsequently, a loss of SDC occurs.

Based on the above conditions and with NO Operator actions,

If Reactor bulk coolant temperature reaches 250°F, the loading on the operating Drywell Chiller will __________ .

IAW 34AB-E11-001-2, Loss of Shutdown Cooling, if SDC is not restored, RWL is expected to reach the Top of Active fuel in approximately __________ .

REFERENCE PROVIDED

A. still be approximately the same;
5 hours 54 minutes

B. still be approximately the same;
6 hours 58 minutes

C. be slowly going up;
5 hours 54 minutes

D✓ be slowly going up;
6 hours 58 minutes

50. 295021AK3.03 001

Description:

IAW 34AB-E11-001-2, Loss of SDC:

Saturation Time is the time differential between the time of complete loss of SDC and the onset of boiling

Evaporation Time is the time diferential between Saturation Time and the Boil-off Time.

34AB-E11-001-2 Att. 1 lists the time to reach TAF is **6 hours and 57 minutes**.

Case 1 : CORE FUEL in UNFLOODED RPV
(Normal RPV water level)

Days After Shutdown	Heat Load (MBTU/hr)	Saturation Time	Evaporation Time	Boil-Off Time
1.0	57.275	52 min	4 hr 50 min	5 hr 42 min
2.0	47.051	1 hr 4 min	5 hr 53 min	6 hr 57 min
3.0	40.644	1 hr 14 min	6 hr 48 min	8 hr 3 min
4.0	36.112	1 hr 23 min	7 hr 40 min	9 hr 3 min
5.0	32.822	1 hr 32 min	8 hr 26 min	9 hr 58 min

The RPV Head Vents tap off the Main Steam Lines prior to the MSIVs. One vent path is from the RPV head through **normally open manual valve** (F005) to MSL "A". This allows a continuous venting of non-condensable gasses during power operations. The second path is from the RPV head to the Drywell Equipment Sump Drain through Air Operated Valves (AOV) F003 and F004. This size pipe is insufficient to prevent the reactor vessel pressurization from decay heat 36 hours after shutdown. This vent path is used during startup or when filling the RPV.

With Reactor coolant 250°F, the RPV will be steaming via the F003 & F004, resulting in Drywell temperatures going up, thus the Drywell Chiller loading will be going up as well to compensate.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the status of Drywell Chiller loading (going up/remain the same) from the RPV steaming into the Drwell due to a loss of Shutdown Cooling.

The "A" distractor is plausible because the reactor head vent valve 2B21-F005 is CLOSED, therefore one RPV vent path is isolated. The second part is plausible because the evaporation time for 2 days after shutdown on Attachment 1 is 5 hr 53 minutes which is the amount of time it takes betweeen when bulk coolant temperature reaches 212°F to TAF.

The "B" distractor is plausible because the reactor head vent valve 2B21-F005 is CLOSED, therefore one RPV vent path is isolated. The second part is correct.

The "C" distractor is plausible since the first part is correct. The second part is plausible because the evaporation time for 2 days after shutdown on Attachment 1 is 5 hr 53 minutes which is the amount of time it takes betweeen when bulk coolant temperature reaches 212°F to TAF.

"D" is Correct.

50. 295021AK3.03 001

References provided to the applicant:

34AB-E11-001-2, Page 16, Attachment 1 ONLY

K/A:

APE: 295021 Loss of Shutdown Cooling

AK3. Knowledge of the reasons for the following responses as they apply to LOSS OF SHUTDOWN COOLING : (CFR: 41.5 / 45.6)

AK3.03 Increasing drywell cooling 2.9 2.9

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-E11-RHR-00701, Residual Heat Removal System, **Ver. 11.1**,
LO H-OP-90000.004

References used to develop this question:

34AB-E11-001-2, Loss Of Shutdown Cooling, **Ver. 6.20**

Modified from HLT Database which was used on the 2016 NRC Exam Q#49

ORIGINAL QUESTION

Unit 2 is shutdown with RHR Loop A aligned for Shutdown Cooling with the following conditions:

o Reactor Shutdown	Two (2) days ago
o The Drywell is open and available for access	
o 2B21-F003, Reactor Head Vent Valve	OPEN
o 2B21-F004, Reactor Head Vent Valve	OPEN
o 2B21-F005, Reactor Manual Head Vent Valve	CLOSED

Subsequently, a loss of SDC occurs.

Based on the above conditions and with NO Operator actions,

IAW 34AB-E11-001-2, Loss of Shutdown Cooling, Reactor bulk coolant temperature is expected to reach 212°F in approximately __________ .

If Reactor bulk coolant temperature reaches 250°F, Drywell temperature indications will __________ .

REFERENCE PROVIDED

A.✓ 1 hour 5 minutes;
be slowly increasing

B. 1 hour 5 minutes;
still be approximately the same

C. 5 hours 54 minutes;
be slowly increasing

D. 5 hours 54 minutes;
still be approximately the same

51. 295023AA2.04 001/20009TA/LT-20009.010/NEW/P-FSAR/BOTH/295023AA2.04/1/1/F/3/ARB/ABG

IAW **Unit 2** FSAR,

If one of the Design Basis Accidents (DBA) listed below were to occur, which ONE of the listed DBAs would result in the HIGHEST expected release of radiation to the public?

A. Loss of Coolant Accident (LOCA)

B. Main Steam Line Break Accident

C. Control Rod Drop Accident

D.✓ Refueling Accident

51. 295023AA2.04 001

Description:

The following table was summarized from the U2 FSAR Chapter 15.0,

DESIGN BASIS ACCIDENT	% OF CORE REACHING CLAD TEMP OF 2200°F	PEAK NUCLEAR SYSTEM PRESSURE	MAXIMUM ESPOSURE AT EXCLUSION AREA WHOLE BODY (Rem)	MAXIMUM ESPOSURE AT EXCLUSION AREA THYROID (Rem)
Control rod drop	0	<1375 psig	2.3×10^{-7}	5.4×10^{-6}
Loss-of-coolant (recirculation line break)	0	Not applicable	3.2×10^{-9}	9.5×10^{-8}
Refueling	0	Not applicable	7.7×10^{-6}	2.9×10^{-4}
Main steam line break	0	Not applicable	1.2×10^{-7}	6.4×10^{-5}

The SBGT system filter efficiency is conservatively set at 95% for iodines and 0% for noble gases. This results in the following activities being released to the environment within 24 hours of the accident:

(1) 17.3 curies of iodine
(2) 14,800 curies of noble gases

Exclusion Area Dose

a. Whole-body dose: 7.7 x 10-6 rem
b. Inhalation dose: 2.9 x 10-4 rem

NOTE: This is the **WORST** accident radiologically speaking.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to interpret the effects of the occurrence of one of the DBAs (Refueling accident) which would result in the worst radiological release to the public.

The "A"distractor is plausible since this is a DBA with a release to the public, just not the worse.

The "B"distractor is plausible since this is a DBA with a release to the public, just not the worse.

The "C"distractor is plausible since this is a DBA with a release to the public, just not the worse.

"D" is Correct.

51. 295023AA2.04 001

References provided to the applicant:

NONE

K/A:

APE: 295023 Refueling Accidents

AA2. Ability to determine and/or interpret the following as they apply to REFUELING ACCIDENTS : (CFR: 41.10 / 43.5 / 45.13)

AA2.04 †Occurrence of fuel handling accident 3.4 4.1

LESSON PLAN/OBJECTIVE:

H-LT-LP-20009, Plant Safety Analysis / Accident Analysis, **Ver. 7.0**, LO LT-20009.010

Reference(s) used to develop this question:

Unit 2 FSAR, Chapter 15.0 SAFETY ANALYSIS (HNP-1 AND HNP-2), **Revision 33.0**

52. 295024G2.1.30 001/05101CAMS/201.076.A.33/NEW/P-EOP/BOTH/295024G2.1.30/1/1/F/3/ARB/ABG

Unit 2 was operating at 100% RTP when an event occurred resulting in the following:

- o Drywell pressure 54 psig and slowly rising

The Shift Supervisor has ordered the Drywell to be Emergency Vented.

31EO-EOP-101-2, Emergency Containment Venting, Section 4.4, Drywell Emergency Vent Path, has been entered.

Based on the above conditions and IAW 31EO-EOP-101-2,

To Emergency Vent the Drywell, the NPO will operate 2T48-F082, Suppression Chamber Emergency Vent Valve, from Panel __________ .

A. 2H11-P601

B. 2H11-P602

C.✓ 2H11-P654

D. 2H11-P657

52. 295024G2.1.30 001

Description:

31EO-EOP-101-2, Emergency Containment Venting,

4.4 Drywell Emergency Path

9. Open 2T48-F082 (Key Locked), Suppression Chamber Emergency Vent Valve on 2H11-P654.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to locate valve 2T48-F082. which will be used during an EOP high Drywell pressure event to Emergency Vent the Drywell.

The "A" distractor is plausible since 2T48-F320, Drywell Vent Valve, is located on panel 2H11-P601 and is operated during the Drywell Emergency venting evolution.

The "B" distractor is plausible since 2T48-F319, Drywell Vent Valve, is located on panel 2H11-P602 and is operated during the Drywell Emergency venting evolution.

"C" is Correct.

The "D"distractor is plausible since panel 2H11-P657 contains the valves for venting the Dywell IAW 31EO-EOP-101-2 using the Drywell Venting Path. (2T48-F334A & 2T48-F335A 2 inch vent valves)

52. 295024G2.1.30 001

References provided to the applicant:

NONE

K/A:

EPE: 295024 High Drywell Pressure

G2.1.30 Ability to locate and operate components, including local controls.
(CFR: 41.7 / 45.7) 4.4 4.0

LESSON PLAN/OBJECTIVE:

H-LT-LP-D11-CAMS-05101, Containment Atmosphere Monitoring System (CAMS), **Ver. 4.1**, EO 201.076.A.33

Reference(s) used to develop this question:

31EO-EOP-012-2, PC Primary Containment Control, **Ver. 7.1**
31EO-EOP-101-2, Emergency Containment Venting, **Ver. 5.0**

53. 295025EK2.09 001/20308RC/201.093.A.01/MOD/P-EOP/BOTH/295025EK2.09/1/1/H/3/ARB/ABG

Unit 2 is operating at 71% RTP when the following MSIVs close:

o 2B21-F022A, Inboard Main Steam Isolation Valve
o 2B21-F028B, Outboard Main Steam Isolation Valve

Which ONE of the following completes these statements?

Based on the above conditions, Reactor power will INITIALLY go __________ .

Subsequently, if RPV pressure peaks at 1078 psig, entry into 31EO-EOP-011-2, RC RPV CONTROL (NON-ATWS), EOP flowchart __________ REQUIRED.

A.✓ up;
is

B. up;
is NOT

C. down;
is

D. down;
is NOT

53. 295025EK2.09 001

Description:

The closing valve causes a Rx pressure rise which, in turn, causes a power increase. EHC will compensate for the pressure increase and the reactor stablizes.

The entry condition into 31EO-EOP-011-2, RC RPV CONTROL (NON-ATWS), EOP flowchart on RPV pressure is 1074 psig.

1080 psig is TS value & LLS will automatically arm at 1120 psig.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to know the relationship between reactor power and a higher than normal RPV pressure. Reactor power will continue to rise until the EOP RC/A flowchart entry condition & RPS scram setpoint is reached.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since the TS value for RPS scram is 1080 psig or the RPV pressure of 1120 where LLS will be automatically armed, therefore not entering RC (NON-ATWS) flowchart.

The "C" distractor is plausible if the applicant thinks with the 2 MSIVs closing that the <90% closure will result in a reactor scram signal causing power to initally lower. The second part is correct.

The "D" distractor is plausible if the applicant thinks with the 2 MSIVs closing that the <90% closure will result in a reactor scram signal causing power to initally lower. The second part is plausible since the TS value for RPS scram is 1080 psig or the RPV pressure of 1120 where LLS will be automatically armed, therefore not entering RC (NON-ATWS) flowchart.

53. 295025EK2.09 001

References provided to the applicant:

NONE

K/A:

EPE: 295025 High Reactor Pressure

EK2. Knowledge of the interrelations between HIGH REACTOR PRESSURE and the following: (CFR: 41.7 / 45.8)

EK2.09 Reactor power 3.9 3.9

LESSON PLAN/OBJECTIVE:

H-LT-LP-EOP-RC-20308, RPV Control (NON-ATWS), **Ver. 10.2**, EO 201.093.A.01

Reference(s) used to develop this question:

34GO-OPS-005-2, Power Changes, **Ver. 29.3**
31EO-EOP-010-2, RC RPV Control (NON-ATWS), **Ver. 11.0**

Modified from 2009 Hatch NRC Exam Q#48

ORIGINAL QUESTION

Unit 2 is at 60% power when Inboard MSIV 2B21-F022A and Outboard MSIV 2B21-F028A inadvertently fail closed.

Which ONE of the choices below completes the following statement?

INITIALLY, reactor power will _________ and a RPS half scram signal _________ be generated.

A.✓ increase;
will

B. increase;
will NOT

C. remain the same;
will

D. remain the same;
will NOT

54. 295026EK1.02 001/20310PC/201.093.A.01/MOD/P-EOP/BOTH/295026EK1.02/1/1/F/3/ARB/ABG

Unit 1 is operating at 100% RTP when a leak occurs inside the Drywell (DW).

Based on the above conditions,

Steam condensation from the event will cause Torus water temperature to heat up ___________ .

The LOWEST listed Torus temperature REQUIRING entry into 31EO-EOP-012-1, PC Primary Containment Control, is __________ .

A✔ uniformly throughout the Torus due to the design of the downcomers; 101°F

B. uniformly throughout the Torus due to the design of the downcomers; 111°F

C. directly under the area of the DW leak due to the energy being distributed directly to the Torus water in that area; 101°F

D. directly under the area of the DW leak due to the energy being distributed directly to the Torus water in that area; 111°F

54. 295026EK1.02 001

Description:

The steam will enter the torus via a ring header and downcomers. The ring header helps to ensure steam distribution is approximately equal throughout the torus. The plausibility for local area heating of the torus is SRVs leaking.

Torus temperature control is necessary to preserve the capability of the plant's emergency heat sink to depressurize the reactor. The loss of the plant's pressure suppression capability due to high torus water temperature may permit high containment pressures to be reached since the decay heat energy in the form of pressure cannot be quenched. As torus water temperature increases, torus cooling is placed in service.

IAW 31EO-EOP-012-2, PC Primary Containment Control, an entry condition is Suppression Pool bulk average temperature exceeding **100ºF**.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to understand the concept of steam condensing into the Torus either by SRV discharge or LOCA and as a result of the Torus heating up from this steam condensation, the temperature at which entry into the EOP flowchart is required.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since 111°F is above the Torus temperature at which the NPO enters 34AB-C71-001-2, Scram Procedure.

The "C" distractor is plausible if the applicant does not understand the purpose/design of the ring header/ downcomers and does not remember that the downcomer will evenly distribute the heat. The applicant could think the downcomer/ring header works like the SRVs since a SRV opening will heat up a local area of the Torus based on which SRV opens. The second part is plausible since it is correct.

The "D" distractor is plausible if the applicant does not understand the purpose/design of the ring header/ downcomers and does not remember that the downcomer will evenly distribute the heat. The applicant could think the downcomer/ring header works like the SRVs since a SRV opening will heat up a local area of the Torus based on which SRV opens. The second part is plausible since 111°F is above the Torus temperature at which the NPO enters 34AB-C71-001-2, Scram Procedure

54. 295026EK1.02 001

References provided to the applicant:

NONE

K/A:

EPE: 295026 Suppression Pool High Water Temperature

EK1. Knowledge of the operational implications of the following concepts as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE : (CFR: 41.8 to 41.10)

EK1.02 Steam condensation 3.5 3.8

LESSON PLAN/OBJECTIVE:

H-EOP-PC-LP-20310, Primary Containment Control (PC), **Ver. 5.0**, EO 201.093.A.01

Reference(s) used to develop this question:

31EO-EOP-012-2, PC Primary Containment Control, **Ver. 7.1**

Modified from HLT Database Q#295026EK1.02-001 which was used on 2015 Hatch NRC Exam Q#53

ORIGINAL QUESTION

Unit 2 is operating at 100% RTP when a leak occurs inside the Drywell (DW).

Steam condensation from the leak will cause Torus water temperature to heat up ___________ .

IAW 31EO-EOP-012-2, PC Primary Containment Control, the LOWEST listed Torus temperature requiring entry into RC Point A of 31EO-EOP-010-2, RC RPV Control (NON-ATWS), is __________ .

A.✓ uniformly throughout the Torus due to the design of the downcomers;
111°F

B. uniformly throughout the Torus due to the design of the downcomers;
121°F

C. directly under the area of the DW leak due to the energy being distributed directly to the

Torus water in that area;
111°F

D. directly under the area of the DW leak due to the energy being distributed directly to the Torus water in that area;
121°F

55. 295028EK1.02 001/20310PC/201.073.A.15/BANK/P-EOP/BOTH/295028EK1.02/1/1/H/3/ARB/ABG

Unit 2 experienced a loss of Instrument Air resulting in a reactor scram.

The following conditions exist:

o Reactor power	3% RTP (all control rods did NOT fully insert)
o RPV Pressure	1110 psig, slowly rising
o RWL	-110 inches, stable
o ADS Inhibit Switches	"INHIBIT" position
o RHR pumps	ONLY 2A running
o Drywell (DW) Pressure	3.0 psig, rising at 0.5 psi/minute
o DW Temperature	370°F, slowly rising

After the above conditions have existed for ten (10) minutes, the NPO places the ADS "INHIBIT" switches to the "NORMAL" position and NONE of the ADS valves OPEN.

Based on the above conditions and IAW 31EO-EOP-012-2, PC Primary Containment Control,

The MOST likely listed reason the ADS valves did NOT open is that __________ .

A. Instrument Air to the ADS valves has been lost

B✓ DW Temperature is above the design criteria

C. only one RHR pump is in operation

D. RWL is too high

55. 295028EK1.02 001

Description:

IAW 31EO-EOP-012-2, PC Primary Containment Control, the drywell design temperature is 340°F and temperature must be reduced or the RPV depressurized prior to reaching this value. Above 340°F, equipment within the drywell may fail to operate if required.

When it is determined that drywell temperature cannot be prevented from reaching 347°F, further release of energy from the RPV to the drywell is minimized by rapidly depressurizing the RPV. 347°F is the maximum temperature at which ADS is qualified.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant why equipment in the DW did not operate (ADS) due to exceeding the environmental qualification on high temperature.

The "A" distractor is plausible since Instrument air is a pneumatic supply to the ADS valves and since air is lost, ADS will not initiate.

"B" is Correct.

The "C" distractor is plausible if the applicant believes the ADS Logic requires a RHR pump has to be in servie in both divisions, therefore, ADS will not initiate.

The "D" distractor is plausible if the applicant believes the ADS Logic requires RWL to be below TAF (-155 inches) therefore, ADS will not initiate.

55. 295028EK1.02 001

References provided to the applicant:

NONE

K/A:

EPE: 295028 High Drywell Temperature

EK1. Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE : (CFR: 41.8 to 41.10)

EK1.02 Equipment environmental qualification 2.9 3.1

LESSON PLAN/OBJECTIVE:

H-EOP-PC-LP-20310, Primary Containment Control (PC), **Ver. 5.0**, EO 201.073.A.15

Reference(s) used to develop this question:

31EO-EOP-012-2, PC Primary Containment Control, **Ver. 7.1**
34AR-654-066-2, Drywell Temp High, **Ver. 5.1**

Bank question from HLT Database which was used on 2011 Hatch NRC Exam Q#53

56. 295030EK1.02 001/20306CURVES/201.065.A.23/BANK/P-EOP/BOTH/295030EK1.02/1/1/H/3/ARB/ABG

Unit 2 is operating at 100% RTP when a Loss of Coolant Accident occurs.

The High Pressure Coolant Injection (HPCI) system is being used to control RWL.

o HPCI flow rate	3500 gpm
o RWL	-80 inches and lowering at one (1) inch per minute
o RHR Loop A	Torus Cooling
o Torus level	135 inches
o Torus temperature	210°F
o Torus Pressure	6 psig

Based on the above conditions,

HPCI pump operation is __________ acceptable NPSH Limits and __________ .

Reference Provided

A. within;
flow is REQUIRED to be raised

B. within;
flow must be MAINTAINED at or below its current flow rate

C. outside of;
reducing flow to 3000 gpm will NOT restore acceptable operation for NPSH limits

D. outside of;
reducing flow to 3000 gpm will RESTORE acceptable operation for NPSH limits

56. 295030EK1.02 001

Description:

The correct answer to this question is dependent on analyzing the correct graph. Graph selection is determined by whether suppression pool water level is At or Above 146 inches, or Below 146 inches. Common misconception among applicants on how to use the graphs, hard copy, due to having the safe region changing as torus pressure changes.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to have know of the implications of low suppression pool water level to HPCI pump NPSH.

The "A" distractor is plausible if the applicant refers to Graph 17A instead of Graph 17B. The second part is plausible since RWL is lowering at a 1"/minute rate and there is no need to reduce HPCI flow. This option is dependent on the applicant referring to the wrong graph plotting operation in the safe area of the NPSH graph.

The "B" distractor is plausible if the applicant refers to Graph 17A instead of Graph 17B. The second part is plausible since the pump is capable of more flow but the applicant maintaining current flow rate or lower to control RPV cooldown.

The "C"distractor is plausible since the first part is correct. The second part is plauaible if the applicant interpolates and uses 6 psig (or uses the wrong line on the graph, below 5 psig limit), this will appear to be a correct option.

"D" is Correct.

56. 295030EK1.02 001

References provided to the applicant:

Unit 2 EOP Graph 17A, HPCI Pump NPSH Limit, (Torus Water Level At or Above 146")
Unit 2 EOP Graph 17B, HPCI Pump NPSH Limit, (Torus Water Level Below 146")

K/A:

EPE: 295030 Low Suppression Pool Water Level

EK1. Knowledge of the operational implications of the following concepts as they apply to LOW SUPPRESSION POOL WATER LEVEL: (CFR: 41.8 to 41.10)

EK1.02 Pump NPSH 3.5 3.8

LESSON PLAN/OBJECTIVE:

EOP-CURVES-LP-20306, EOP Curves and Limits, **Ver. 3.0**, EO 201.065.A.27

Reference(s) used to develop this question:

Unit 2 EOP Graph 17A, HPCI Pump NPSH Limit, (Torus Water Level At or Above 146"), **Ver. 3.0**
Unit 2 EOP Graph 17B, HPCI Pump NPSH Limit, (Torus Water Level Below 146"), **Ver. 3.0**

Bank question from HLT Database which was used on 2009 Hatch NRC Exam Q#55

57. 295031G2.1.20 001/50239SG/039.002.D/BANK/P-NORM/BOTH/295031G2.1.20/1/1/H/2/ARB/ABG

Unit 1 was operating at 100% RTP when the following occurs:

- o All normal feedwater is lost
- o Reactor Scram
- o RPV Pressure 985 psig
- o RWL -45 inches

- o RCIC Flow Controller (1E51-R612) Indications:
  - Flow Indication 500 GPM
  - Auto Green LED ILLUMINATED
  - Demand Output 0

- o RCIC Turb Speed (1E51-R610) 300 RPM
- o RCIC Pump Disch Press (1E51-R601) 50 psig

Based on the above conditions and IAW NMP-OS-007-001, Conduct of Operations Standards and Expectations, and 34SO-E51-001-1, Reactor Core Isolation Cooling (RCIC) System,

The RCIC flow controller will be __________ .

A. left in Automatic, and RCIC injection flow will start raising RWL

B. left in Automatic, but RCIC should be tripped because it is pumping 500 gpm through a feedwater line break

C✓ placed in Manual, and the controller output should be raised until discharge pressure is greater than 985 psig

D. placed in Manual, but the controller output should be lowered until RCIC flow is 400 gpm

57. 295031G2.1.20 001

Description:

RCIC rpms are lower than normal and the controller ouput is zero. This indicates a controller malfunction. RCIC won't be able to inject until its discharge pressure is greater than reactor pressure.

IAW NMP-OS-007-001; Step 4.33.2, Expectations

1. Manual Control

The normal mode of control of a system designed for automatic operation is automatic. Unless directed by procedure or necessary to address a transient, SS permission shall be obtained prior to transferring systems from automatic to manual control or vice versa. **IF an automatic control malfunctions, the operator takes action to place that control in manual**.

In all cases, WHEN manual operations are required, the following guidance shall be used:

Before placing controls in manual, the operator determines the parameter to be controlled and the controlling band for this parameter, reviews expected system response, and establishes contingencies for potential off-normal events due to the controller being in manual whenever practicable and as time allows.

An operator monitors the system for proper response during and after the transfer.

While in manual, the controlled parameter should be maintained as close as practical to the expected automatic value (within the controlling band, IF previously established).

WHEN a system or component has been placed in manual due to a transient caused by an automatic control malfunction, SM permission is required prior to returning the system or component to automatic control following stabilization from the transient and correction of the malfunction.

WHEN manual operation is no longer required, operators return the system to automatic or standby mode.

<u>K/A JUSTIFICATION:</u>

This question satisfies the K/A statement by asking the applicant to evaluate the start of RCIC & then execute steps in NMP-OS-007-001 to recover the low RWL event (controller in manual).

The "A" distractor is plausible since this would be selected if the 500 gpm is determined to be a valid injection flow and RCIC will recover RWL.

The "B" distractor is plausible since this would be selected if the 500 gpm is determined to be a valid injection flow indication and that the low discharge pressure indicates RCIC is injecting outside the vessel.

"C" is Correct.

The "D" distractor is plausible since this would be selected if the 500 gpm flow is determined to be a valid injection flow and the operator remembers that the flow controller is set at 400 gpm (so manual control is necessary to return flow to the setpoint).

57. 295031G2.1.20 001

References provided to the applicant:

NONE

K/A:

EPE: 295031 Reactor Low Water Level

G2.1.20 Ability to interpret and execute procedure steps.
(CFR: 41.10 / 43.5 / 45.12) 4.6 4.6

LESSON PLAN/OBJECTIVE:

LT-SG-50239, Controller Malfunctions, **Ver. 11.1** , LO 039.002.D

Reference(s) used to develop this question:

NMP-OS-007-001, Conduct of Operations Standards and Expectations, **Ver. 16.2**
34SO-E51-001-1, Reactor Core Isolation Cooling (RCIC) System, **Ver. 28.0**

Bank question from HLT Database which was used on 2009 HLT-5 Hatch NRC Exam Q#56

58. 295037EK3.05 001/20306CURVES/201.071.A.17/MOD/P-EOP/BOTH/295037EK3.05/1/1/F/3/ARB/ABG

An ATWS exists on **Unit 2** with boron injection in progress.

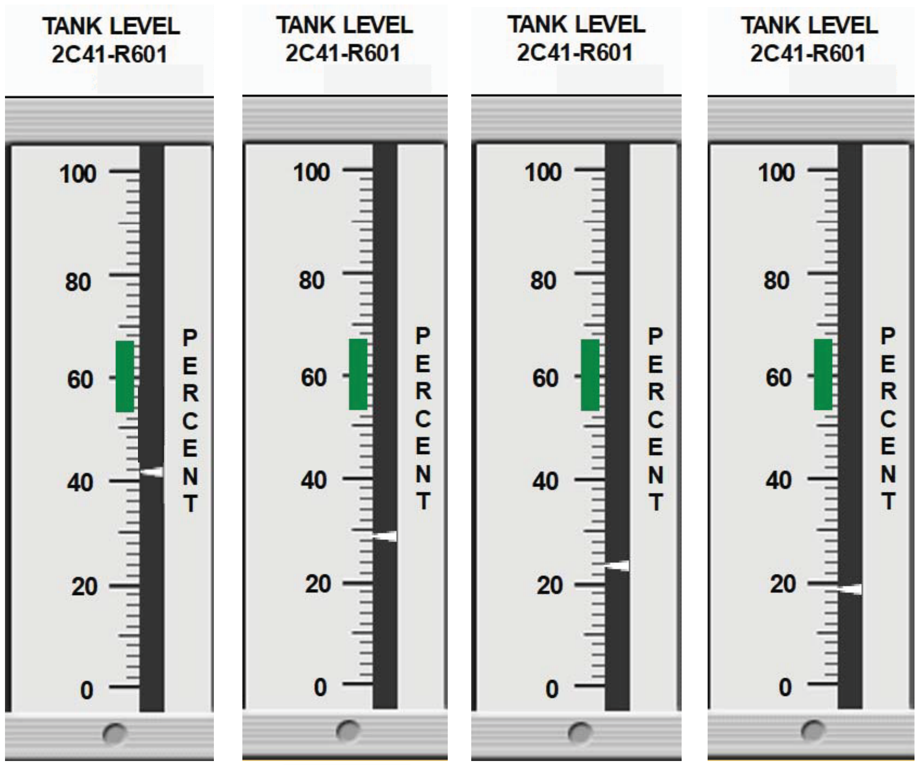


Figure 1 Figure 2 Figure 3 Figure 4

Based on the above conditions and IAW 31EO-EOP-011-2, RCA EOP flowchart,

The Figure which indicates the HIGHEST SBLC Tank level that will result in maintaining the Reactor shutdown under ALL conditions is __________ .

A. Figure 1

B✓ Figure 2

C. Figure 3

D. Figure 4

58. 295037EK3.05 001

Description:

The Cold Shutdown Boron Weight is defined to be the least weight of soluble boron which, if injected into the RPV and mixed uniformly, will maintain the Reactor shutdown under all conditions. The weight is utilized to assure the Reactor will remain shut down irrespective of control rod position or RPV water temperature. The Cold Shutdown Boron Weight for Hatch 2 is: 1008 lbm or **30% SBLC Tank Level**.

IAW RCA EOP flowchart;

Table Q-3 SHUTDOWN BORON WEIGHTS

Boron Injected	Tank Level	Weight (Sodium pentaborate)
Hot Shutdown	44%	573 lbm
Cold Shutdown	30%	1008 lbm
When using Alternate Boron Injection methods see 31EO-EOP-109-2		

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant which SBLC Tank level Figure represents the cold shutdown boron level which corresponds to the level that will result in the reactor remaining shutdown during all conditions (reason for cold shutdown boron weight).

The "A" distractor is plausible since this is 2% below the Hot Shutdown Boron Weight of 44% on Unit 2.

"B" is Correct.

The "C"distractor is plausible since this is 1% below the Tank level where the Unit 1 SBLC Heaters are to be securred (25%).

The "D"distractor is plausible since this is 1% below the Tank level where the Unit 2 SBLC Heaters are to be securred (20%).

58. 295037EK3.05 001

References provided to the applicant:

NONE

K/A:

EPE: 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown

EK3. Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : (CFR: 41.5 / 45.6)

EK3.05 Cold shutdown boron weight: Plant-Specific 3.2 3.7

LESSON PLAN/OBJECTIVE:

EOP-CURVES-LP-20306, EOP Curves And Limits, **Ver. 3.0**, EO 201.071.A.17

Reference(s) used to develop this question:

34SO-C41-003-1, Standby Liquid Control System, **Ver. 12.4**
34SO-C41-003-2, Standby Liquid Control System, **Ver. 12.5**
31EO-EOP-011-2, RCA EOP flowchart, **Ver. 12.0**

Modified from HLT Database Q#211000K4.03-001 which was used on
2009 Hatch HLT-5 NRC Exam Q#10

ORIGINAL QUESTION

Concerning the Unit 2 Standby Liquid Control (SBLC) system:

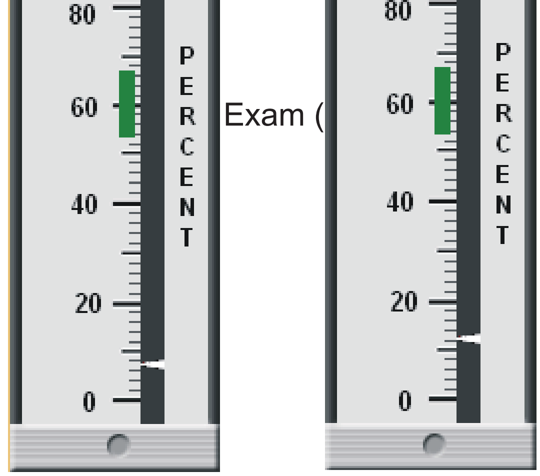


Figure A **Figure B**

Which ONE of the following completes both of these statements?

> During normal operation, the means by which Sodium Pentaborate is CONTINUOUSLY maintained in solution inside the SBLC tank is by the use of __________ .
>
> Given the two figures shown above, and that SBLC has been initiated during an ATWS, __________ indicates the HIGHEST SBLC tank level which ensures that Cold Shutdown Boron Weight has been injected into the RPV.

A. tank heaters;
Figure A

B. an air sparger;
Figure A

C.✓ tank heaters;
Figure B

D. an air sparger;
Figure B

59. 295038EA2.03 001/20325SCRR/201.081.B.03/NEW/P-EOP/BOTH/295038EA2.03/1/1/H/2/ARB/ABG

Unit 1 was operating at 100% RTP when an unisolable Primary System leak occurred in the **Unit 1** Reactor Building.

The following radiation levels exist on 1D11-K609A-D, RX BLDG POT CONTAM AREA, at the indicated time:

Time:	**mR/hr**
01:00	6.0 mR/hr
01:10	12.0 mR/hr
01:20	25.0 mR/hr
01:30	50.0 mR/hr

Based on the above conditions,

The EARLIEST listed time that the Off-Site release rate changed from a GROUND level release to an ELEVATED release is __________ .

A. 01:00

B. 01:10

C.✓ 01:20

D. 01:30

59. 295038EA2.03 001

Description:

Secondary Containment Isolation System

Unit 1 and 2 Reactor Building Zones and Unit 1 and 2 Refueling Floor Zone

Any of the following conditions will generate an isolation signal:

A & B instruments isolate the inboard valves
C & D instruments isolate the outboard valves.

Unit 1 or Unit 2 Drywell pressure 1.85 psig
Unit 1 or Unit 2 Reactor water level -35"
Unit 1 Reactor zone exhaust ventilation radiation level **18 mR/hr on 1D11-K609 A-D**.
Unit 2 Reactor zone exhaust ventilation radiation level 18 mR/hr on 2D11-K609 A-D.
Unit 1 Refueling zone exhaust ventilation radiation level 18 mR/hr on 1D11-K611 A-D.
Unit 2 Refueling zone exhaust ventilation radiation level 18 mR/hr on 2D11-K611 A-D.
Unit 2 Refueling zone exhaust ventilation radiation level >6.9 mR/hr on 2D11-K634 A-D.
Unit 2 Refueling zone exhaust ventilation radiation level >5.7 mR/hr on 2D11-K635 A-D.

An isolation signal will cause the following automatic actions:

The supply and exhaust fans trip, and the ventilation dampers close for the:
Unit 1 Reactor Building Zone I
Unit 2 Reactor Building Zone II
Unit 1 & 2 Refueling Floor Zone III

The Unit 1 SBGT system will start and take suction on both the Unit 1 Reactor Building and the Refueling Floor.

The Unit 2 SBGT system will start and take suction on both the Unit 2 Reactor Building and the Refueling Floor.

Prior to the isolation signal, the unisolable leak is being released to the Reactor Building Stack. Once Secondary Containment isolates on both units, the release will shift to the Main Stack via SBGT System.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant when the off site release changes to an elevated release based upon radiation levels in the Reactor Building.

The "A"distractor is plausible since 6.0 mR/hr is above the Secondary Containment Isolation setpoint for Unit 2 Refueling zone exhaust ventilation radiation level of >5.7 mR/hr on 2D11-K635 A-D which would cause the release to change from ground to elevated.

The "B" distractor is plausible since 12.0 mR/hr is above the Secondary Containment Isolation setpoint for Unit 2 Refueling zone exhaust ventilation radiation level of >6.9 mR/hr on 2D11-K634 A-D which would cause the release to change from ground to elevated.

"C" is Correct.

The "D"distractor is plausible since 50 mR/hr is the LOWEST Max Normal Operating Value mR/hr on Table SC-1.4 of the SC/RR EOP flowchart.

59. 295038EA2.03 001

References provided to the applicant:

NONE

K/A:

EPE: 295038 High Off-Site Release Rate

EA2. Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : (CFR: 41.10 / 43.5 / 45.13)

EA2.03 †Radiation levels 3.5* 4.3*

LESSON PLAN/OBJECTIVE:

EOP-SCRR-LP-20325, Secondary Containment / Radioactivity Release Control, **Ver. 3.0**,
EO 201.081.B.03

Reference(s) used to develop this question:

31EO-EOP-014-1, SC/RR EOP flowchart, **Ver. 12.0**

60. 300000K5.01 001/03501P51/P70/200.025.A.02/BANK/P-AB/BOTH/300000K5.01/2/1/F/2/ARB/ABG

Unit 2 is in startup at 30% RTP with the following Station Service Air Compressor (SSAC) lineup:

- o SSAC 2C in Service
- o SSAC 2B in Auto/Standby
- o SSAC 2A in PTL/OFF (Danger Tagged out of service)

Subsequently, SSAC 2C trips and the SSAC 2B fails to start automatically or manually.

Actions to restore SSAC 2C and SSAC 2B have been unsuccessful.

Based on the above conditions and IAW 34AB-P51-001-2, Loss Of Instrument And Service Air System Or Water Intrusion Into The Service Air System,

The combination of alarms that REQUIRES a reactor scram to be inserted is __________ .

A. SCRAM VLV PILOT AIR HDR PRESS HIGH/LOW (603-131) coincident with CHARGING WATER PRESSURE HIGH, (603-139)

B.✓ SCRAM VLV PILOT AIR HDR PRESS HIGH/LOW (603-131) coincident with CRD HYD TEMP HIGH, (603-140)

C. CRD ACCUMULATOR PRESS LOW OR LEVEL HIGH (603-148) coincident with CHARGING WATER PRESSURE HIGH, (603-139)

D. CRD ACCUMULATOR PRESS LOW OR LEVEL HIGH (603-148) coincident with CRD HYD TEMP HIGH, (603-140)

60. 300000K5.01 001

Description:

34AB-P51-001-2, Loss Of Instrument And Service Air System Or Water Intrusion Into The Service Air System, states the following:

4.5 Enter 34AB-C71-001-2, Scram Procedure, AND SCRAM the reactor IF any of the following conditions occur:

4.5.1 SCRAM VLV PILOT AIR HDR PRESS HIGH/LOW (603-131) COINCIDENT with CRD HYD TEMP HIGH (603-140).

4.5.2 Scram pilot valve air header pressure less than or equal to 50 PSIG as indicated locally on 2C11-R013.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the operational implication (scram requirements) when losing all of the IAS air compressors.

The "A" distractor is plausible since the first part is correct. The second part is plausible since the FCV fails closed which would cause the charging water header pressure to increase to the high level alarm. Even though this will happen it is not a condition to scram the reactor.

"B" is Correct.

The "C" distractor is plausible if the applicant thinks that the loss of SSAC will cause control rod Scram Inlet/Outlet valves to start opening slightly which will bleed off the accumulator pressure and give the alarm. Even though this would happen (ONLY if the 2P52-F565 fails to open) it is not a condition to scram the reactor. The second is plausible since the FCV fails closed which will cause the charging water header pressure to increase to the high level alarm. Even though this would happen it is not a condition to scram the reactor.

The "D" distractor is plausible if the applicant thinks that the loss of SSAC will cause control rod Scram Inlet/Outlet valves to start opening slightly which will bleed off the accumulator pressure and give the alarm. Even though this would happen (ONLY if the 2P52-F565 fails to open) it is not a condition to scram the reactor. The second part is plausible since it is correct.

60. 300000K5.01 001

References provided to the applicant:

NONE

K/A:

300000 Instrument Air System (IAS)

K5. Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: (CFR: 41.5 / 45.3)

K5.01 Air compressors 2.5 2.5

LESSON PLAN/OBJECTIVE:

P51-P52-P70-PLANT AIR-LP-03501, **Ver. 7.0**, EO 200.025.A.02

Reference(s) used to develop this question:

34AB-P51-001-2, Loss Of Instrument And Service Air System Or Water Intrusion Into The Service Air System, **Ver. 6.3**
Bank question from HLT Database Q#300000K5.01-002

61. 300000K5.13 001/03501P51/P70/035.001.A.02/BANK/ SYS-I/BOTH/300000K5.13/2/1/H/3/ABG/ARB

Unit 2 is operating at 50% RTP when the following occurs:

- o BOTH Instrument Air After Filters, 2P52-D102A&B malfunction and become clogged
- o Air pressure DOWNSTREAM of the After Filters stabilizes at 35 psig

Based on the above conditions,

Service Air Header Pressure __________ remain in its NORMAL band.

2P52-F015, Turb. Bldg Inst Air To RW Bldg Isol valve, __________ .

A. will NOT;
close and remain closed

B. will NOT;
continously cycle open and closed

C✓ will;
close and remain closed

D. will;
continously cycle open and closed

61. 300000K5.13 001

Description:

The Service Air Header has an isolation valve (F017) that isolates the Service Air System from the Instrument Air System in the event of a leak in the Service Air System. The isolation valve auto-closes at 70 psig decreasing and auto-opens as pressure increases above 70 psig. This valve is located **upstream** of the Pre-filters/Dryers/After-filters. If the After-filters are clogging, the pressure upstream will remain approximately the same (in NORMAL band) as the pressure when the After-filters are functioning properly. The response of the Service Air Header is opposite when a leak occurs downstream of the filters. Pressure downstream of the filters causes upstream pressure to decrease as well resulting in the Service Air Header to isolate.

6. Non-Essential Instrument Air Header Isolation Valve F015

   a. The isolation valve is used to isolate the Non-Essential Instrument Air Header from the rest of the Instrument Air System on a low-pressure condition sensed upstream of the valve to open or close at 50 psig.

   b. The isolation valve is located on the 112' elevation of the Control Building adjacent to the SSACs.

   c. It is a pneumatically controlled valve that may also be operated from the P700 panel in the Main Control Room.

   d. The valve automatically isolates the Non-Essential Instrument Air Header when air pressure falls to 50 psig decreasing and auto-opens when pressure increases above 61 psig. This could result in the valve cycling open and closed in the event of an actual break in the Non-Essential Air header.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the operational status of air headers based on filter degradation.

The "A" distractor is plausible since this would be the expected response if a leak was occurring downstream of the After-filters instead of a clogged After-filter. The second part is correct.

The "B" distractor is plausible since this would be the expected response if a leak was occurring downstream of the After-filters instead of a clogged After-filter. The second part is plausible since this would be the expected response if a leak was down stream of the F015.

"C" is correct.

The "D" distractor is plausible since the first part is correct and the second part is plausible since this would be the expected response if a leak was down stream of the F015.

61. 300000K5.13 001

References provided to the applicant:

NONE

K/A:

300000 Instrument Air System (IAS)

K5. Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: (CFR: 41.5 / 45.3)

K5.13 Filters 2.9 2.9

LESSON PLAN/OBJECTIVE:

P51-P52-P70-PLANT AIR-LP-03501, Plant Air Systems, **Ver. 7.0**, EO 035.001.A.02 & EO 200.025.A.05

Reference(s) used to develop this question:

34SO-P51-002-2, Instrument And Service Air Systems, **Ver. 21.9**
Bank Question from HLT data base

62. 400000K3.01 001/00301G31/003.013.A.03/MOD SYS-B/BOTH/400000K3.01/2/1/F/3/ARB/ABG

Unit 2 was operating at 100% RTP when a total loss of Reactor Building Closed Cooling Water (RBCCW) occurred.

Based on the above conditions,

The LOWEST RWCU Pump cooling water temperature which will result in the operating RWCU pump AUTOMATICALLY tripping is __________ .

When the operating RWCU Pump trips, BOTH Group 5 isolation valves __________ AUTOMATICALLY close.

A. 130°F;
will NOT

B. 130°F;
will

C.✓ 140°F;
will NOT

D. 140°F;
will

62. 400000K3.01 001

Description:

RBCCW cools the RWCU pump. When temperature reaches 140°F, the operating RWCU pump will trip but neither RWCU isolation valve will close.

RBCCW cools the RWCU Non-Regen Heat Exchanger also. When temperature reaches 140 deg F, then ONLY the F004 valve closes (normally on a Group 5 isolation, both F001 and F004 close).

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to know how the loss of RBCCW (CCWS) will effect RWCU (loads).

The "A" distractor is plausible because the 130°F is the setpoint for alarm RWCU FILTER INLET TEMP HIGH, 602-427. The second part is plausible since it is correct.

The "B" distractor is plausible because the 130°F is the setpoint for alarm RWCU FILTER INLET TEMP HIGH, 602-427. The second part is plausible since there is a time when only one RWCU isolation valve will automatically close (non-regenerative Hx outlet high).

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since there is a time when only one RWCU isolation valve will automatically close (non-regenerative Hx outlet high).

62. 400000K3.01 001

References provided to the applicant:

NONE

K/A:

400000 Component Cooling Water System (CCWS)

K3. Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: (CFR: 41.7 / 45.6)

K3.01 Loads cooled by CCWS 2.9 3.3

LESSON PLAN/OBJECTIVE:

G31-RWCU-LP-00301 Rx Water Cleanup, **Ver. 5.2**, EO 003.013.A.03

References used to develop this question:

34SO-G31-003-2, Reactor Water Cleanup System, **Ver. 44.3**
Modified from HLT Database which was used on 2016 ILT-10 NRC Exam Q#62

ORIGINAL QUESTION

Unit 1 was operating at 100% RTP when a total loss of Reactor Building Closed Cooling Water (RBCCW) occurred.

Based on the above conditions,

The LOWEST RWCU Non-Regenerative Heat Exchanger outlet temperature which will result in a RWCU system isolation is __________ .

This isolation signal will result in automatic closure of ONLY the __________ , Rx Water Cleanup Valve.

A. 130°F;
1G31-F001

B. 130°F;
1G31-F004

C. 140°F;
1G31-F001

D.✓ 140°F;
1G31-F004

63. 500000EK2.07 001/20315EOP104/LO 3/BANK/P-EOP/BOTH/500000EK2.07/1/2/H/3/ARB/ABG

Unit 2 has experienced an accident that results in these Primary Containment parameters:

o Drywell (DW) Hydrogen concentration	1.8%
o DW Oxygen concentration	1.7%
o DW pressure	14 psig and slowly rising
o Torus level	>300 inches

The following procedures are in progress:

31EO-EOP-012-2, Primary Containment Control
31EO-EOP-104-2, Primary Containment Venting For Hydrogen and Oxygen Control

Based on the above conditions and procedures,

The operator is REQUIRED to vent the __________ .

Placing Torus Sprays in service __________ ALLOWED.

A. Torus;
is

B. Torus;
is NOT

C. DW;
is

D.✓ DW;
is NOT

63. 500000EK2.07 001

Description:

With the concentrations of H_2 and O_2 given in this question, the EOPs direct the operators to:

- o Vent the Suppression Chamber if Suppression Pool water level is <300"
- o Vent the DW if Suppression Pool water level is **>300"**
- o Purge the DW and Suppression Chamber

Venting the primary containment through the torus vents is preferred for reasons that will be discussed later, but may not be possible if the torus vents are covered with water. The torus vents are located at approximately 331 inches, but since the upper limit of control room instrumentation is 300 inches, this is the value used to decide whether the vents are covered.
If torus water level is **above 300 inches**, it is assumed that the torus vents are covered and direction to use the **drywell vents** to vent the primary containment is given.
If above 11 psig, torus sprays may reduce the pressure rapidly enough that drywell sprays would not be required. Initiation of torus sprays is dependent upon torus water level. Since the spray nozzles would not be effective in reducing pressure if they were covered, **spray is not initiated if level is at or above 285 inches**.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant which area of containment will be vented (DW vs. Torus) with a high hydrogen concentration/torus level.

The "A" distractor is plausible since it would be correct if Torus level was <300 inches. The second part is plausible since it would be correct if Torus level was <285 inches.

The "B" distractor is plausible since it would be correct if Torus level was <300 inches. The second part is correct.

The "C" distractor is plausible since the first part is correct. The second part is plausible since it would be correct if Torus level was <285 inches.

"D" is Correct

63. 500000EK2.07 001

References provided to the applicant:

NONE

K/A:

EPE: 500000 High Containment Hydrogen Concentration

EK2. Knowledge of the interrelations between HIGH CONTAINMENT HYDROGEN CONCENTRATIONS the following: (CFR: 41.7 / 45.8)

EK2.07 Drywell vent system 3.2 3.7

LESSON PLAN/OBJECTIVE:

EOP-104-LP-20315, EOP 104: Primary Containment Venting For Hydrogen Control, **Ver. 2.0**, LO 3

Reference(s) used to develop this question:

31EO-EOP-012-2, PC Primary Containment Control, **Ver. 7.1**
31EO-EOP-104-2, Primary Containment Venting For Hydrogen and Oxygen Control, **Ver. 4.14**
Bank question from HLT Database which was used on 2012 HLT-7 NRC Exam Q#63

64. 600000AK2.04 001/10002N40/017.006.A.09/BANK/SYS-I/BOTH/600000AK2.04/1/1/H/3/ABG/ARB

Unit 1 is operating at 30% RTP when the Main Transformer experiences a fire.

Subsequently, the following annunciators are received:

- o MAIN XFMR FAULT PRESSURE ALARM, (651-114)
- o FIRE ALARM, (651-160)

IAW 651-114 and based on the above conditions, ten (10) seconds later,

The **Unit 1** RPS Scram Relays (K14s) will be __________ .

Unit 1 4160 VAC Station Service Buses __________ fast transfer to the Startup Transformers.

A.✓ DE-ENERGIZED;
will

B. DE-ENERGIZED;
will NOT

C. ENERGIZED;
will

D. ENERGIZED;
will NOT

64. 600000AK2.04 001

Description:

With alarm 651-114 alarming, a Simultaneous trip of the Main Generator will occur. Simultaneous type of tripping is used when immediate disconnection of the Generator is required. On a Main Transformer Sudden Pressure (Generator fault conditions), the main turbine will trip (reactor scrams since power > 27.6%), the EX2100 Static Exciter will trip and the Main Generator Output breakers will open simultaneously. When both Main Generator Output breakers open, the Station Service transfer logic will transfer supply to the Startup Transformers.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing how the Main Generator PCBs respond to the 4160VAC Station Service supply breakers respond, as well as the scram relays based on plant conditions at the time of the fire.

"A" is Correct

The "B" distractor is plausible since the first part is correct and the second part would be correct if an Emergency 4160VAC bus on Unit 1 was powered from its alternate power supply.

The "C" distractor is plausible if reactor power is < 27.6% RTP and the second part is correct.

The "D" distractor is plausible if reactor power is < 27.6% RTP and the second part would be correct if an Emergency 4160VAC bus on Unit 1 was powered from its alternate power supply.

64. 600000AK2.04 001

References provided to the applicant:

NONE

K/A:

APE:

600000 Plant Fire On Site

AK2. Knowledge of the interrelations between PLANT FIRE ON SITE and the following:

AK2.04 Breakers / relays / and disconnects 2.5 2.6

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-N40-MG-10002, Main Generator, **Ver. 10.0,** EO 017.006.A.09

Reference(s) used to develop this question:

34AR-651-114-1, Main XFMR Fault Pressure Alarm, **Ver. 4.6**
Bank question from HLT Database

65. 700000AA1.04 001/02706S11/200.116.A.04/MOD/P-AB/BOTH/700000AA1.04/1/1/H/3/ARB/ABG

Unit 1 is operating at 100% RTP when a grid disturbance results in all 4160 VAC Emergency Buses indicating 3700 VAC.

The load dispatcher reports that these conditions will exist for 4 hours.

Based on the above conditions,

IAW 34AB-S11-001-0, Operation With Degraded Voltage, one (1) hour later, __________ is REQUIRED to be manually started.

After transferring the associated 4160 VAC Emergency Bus to the above EDG, alarm ROD OUT BLOCK, 603-238, on 1H11-P603 __________ be RECEIVED.

A.✓ EDG 1A;
will

B. EDG 1A;
will NOT

C. EDG 1C;
will

D. EDG 1C;
will NOT

65. 700000AA1.04 001

Description:

IAW 34AB-S11-001-0 step:

4.4.3 IF the 4160 VAC Bus voltages are NOT RESTORED to acceptable levels WITHIN 30 minutes, perform the following to maintain 4160V 1E emergency bus voltage. (Two handed operations will be necessary):

4.4.3.2 Start the 1**R43-S001A D/G**, using the start switch, panel 1H11-P652.

4.4.3.2.1 Override 1P41-F310A AND 1P41-F310D, per 34AB-P41-001-1.

4.4.3.2.2 Open AND hold the following control switches for 1R22-S005, 4160V 2E Bus UNTIL the emergency supply breaker closes:

- o ACB 135712 Unit 1, Normal Supply, 4160V Bus 1E
- o ACB 135711 Unit 1, Alternate Supply, 4160V Bus 1E

4.4.3.2.3 Load 1A D/G as necessary AND perform applicable abnormal procedures for:

- o loss of 4160 V emergency busses
- o loss of 600V emergency busses
- o loss of essential busses
- o loss of instrument busses
- o loss of RPS busses

4.4.3.2.4 Reset 4160V bus 1E LOSP LOCKOUT (86) Relay.

4.4.3.2.5 Place the Overrides for 1P41-F310A AND 1P41-F310D in NORMAL.

The RPS flywheel will maintain minor flucations with input voltage but when the normal and alternate breakers are held open, voltage on the 4160VAC bus will drop low enough to trip the 86 Lockout, resulting in the tripping of RPS 1A to trip.

De-energizing one RPS bus will result in the loss of two 2 of 4 voter modules, and a RBM Interface Unit (the appropriate RBM develops a critical self-test fault) occurs due to a loss of power. A rod out block (603-238) occurs **due to the RBM critical self-test fault**.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to monitor the Rod Out Block alarm (reactor controls) during a degraded grid disturbance.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since 603-238 will not be received when manually transferring 4160VAC Emergency bus from normal to alternate supply.

The "C"distractor is plausible if the applicant knows that one of the EDGs is started and selects EDG 1C which will repower 600VAC Bus 1D and would be required if the 4160VAC Bus 1G de-energizes. The second part is plausible since it is correct.

The "D"distractor is plausible if the applicant knows that one of the EDGs is started and selects EDG 1C which will repower 600VAC Bus 1D and would be required if the 4160VAC Bus 1G de-energizes. The second part is plausible since 603-238 will not be received when manually transferring 4160VAC Emergency bus from normal to alternate supply.

65. 700000AA1.04 001

References provided to the applicant:

NONE

K/A:

APE: 700000 Generator Voltage and Electric Grid Disturbances

AA1. Ability to operate and/or monitor the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES:
(CFR: 41.5 and 41.10 / 45.5, 45.7, and 45.8)

AA1.04 Reactor controls 4.1 4.1

LESSON PLAN/OBJECTIVE:

S11-LP-02706-02, Basic Grid Operating Concepts, **Ver. 3.0**, EO 200.116.A.04

Reference(s) used to develop this question:

34AB-S11-001-0, Operation With Degraded System Voltage, **Ver. 4.1**
Modified from HLT Database question which was used on 2016 NRC Exam Q#65

ORIGINAL QUESTION

Unit 1 is operating at 100% RTP when a grid disturbance results in all 4160 VAC Emergency Buses indicating 3700 VAC.

The load dispatcher reports that these conditions will exist for 4 hours.

Based on the above conditions,

IAW 34AB-S11-001-0, Operation With Degraded Voltage, one (1) hour later, 4160 VAC Bus __________ is REQUIRED to be powered by its associated EDG on **Unit 1**.

When transferring the 4160 VAC Emergency Bus to its associated EDG, the respective LOSS OF OFF SITE POWER alarm on 1H11-P652 __________ be RECEIVED.

A.✓ 1E;
will

B. 1E;
will NOT

C. 1G;
will

D. 1G;
will NOT

66. G2.1.6 001///NEW/P-NORM/BOTH/G2.1.6/3/F/2/ARB/ABG

The Shift Supervisor has ordered a NPO to enter 31EO-EOP-113-1, Terminating And Preventing Injection Into The RPV.

The NPO simultaneously holds the 1E11-F017A, RHR Injection Valve, Control Switch to CLOSE and holds the 1E11-F017B, RHR Injection Valve, Control Switch to CLOSE.

Once 1E11-F017A and 1E11-F017B are closed, the NPO performs a Crew Update.

Based on the above conditions and IAW NMP-OS-007-001, Conduct of Operations Standards and Expectations, which ONE of the choices below completes the following statements?

SS permission __________ REQUIRED, prior to simultaneously holding 1E11-F017A and 1E11-F017B Control Switches to CLOSE.

When the NPO performed the Crew Update, the available team members __________ REQUIRED to raise a hand to indicate they are ready to listen.

A. was;
were

B. was;
were NOT

C. ✓ was NOT;
were

D. was NOT;
were NOT

66. G2.1.6 001

Description:

NMP-OS-007-001, Conduct of Operations Standards and Expectations,

4.10 CONTROL BOARD MANIPULATIONS/TWO HANDED OPERATIONS

4.10.1 Expectation

Control switches are operated single handed, except as specified below, or as specified in **Attachment 2**.

Control switches are operated single handed (i.e. simultaneous manipulation of two separate switches or controls will be avoided). This is to support use of STAR and focusing on the single piece of equipment being manipulated, except as specified below:

1. The Shift Supervisor may allow specific instances of Two Handed Operation.

   a. Two handed operation is appropriate WHEN specifically directed/permitted by procedure, or required by design. This allowance is generally limited to conditions:

      (1) where two switches must be operated to initiate a response, and do not require sequential operation.

      (2) where two switches have similar function with a need or desire for close coordination between the two operations to mitigate the significance/consequence of a transient or potential transient.

   b. Unless specified in Attachment 2, the use of Two Handed Operation should be **specifically requested**, and granted on a case by case bases, such allowance should not be routine.

Attachment 2:

Hatch

Energizing emergency 4KV bus while holding the 86 lockout closed

Control Rod withdrawal using rod movement and RONOR switches

Operation of RHR injection valves emergency operating procedures

Tripping of HPCI

<u>Crew briefings</u> are of appropriate length, and generally contain the following applicable elements:

- o Begin:
  Announcement: Crew Brief
  Ensure intended audience is attentive
- o Review:
  What event caused the transient, IF known or time permits
  Summary of overall plant status
  Discuss any established or existing Critical parameters
- o Input:
  Poll crew for input

Review existing Critical Parameters (what/who responsible) are in place.
- o Expectations:
  State Expected future actions, strategies and contingency plans
- o Finish:
  Announcement: End of Brief

Crew updates should be performed WHEN time-critical or status-critical information becomes available that requires team awareness. Crew updates may be used during normal or transient conditions. WHEN an update is used, it should contain the following elements:
- o Announcement: Crew Update
- o Available **team members raise a hand** to indicate that they are ready to listen
- o Concise statement of the critical information
- o Announcement: End of Update

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant if SRO permission is needed prior to performing the specific two handed operation and how the applicant will update the crew.

The "A" distractor is plausible since closing the Core Spray injection valves in this procedure would require obtaining prior SRO permission. The second part is plausible since it is correct.

The "B" distractor is plausible since closing the Core Spray injection valves in this procedure would require obtaining prior SRO permission. The second part is plausible since it would be correct for a crew brief (not required to raise hand).

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since it would be correct for a crew brief (not required to raise hand).

66. G2.1.6 001

References provided to the applicant:

NONE

K/A:

2.1 Conduct of Operations

G2.1.6 Ability to manage the control room crew during plant transients.
(CFR: 41.10 / 43.5 / 45.12 / 45.13) 3.8* 4.8

LESSON PLAN/OBJECTIVE:

Reference(s) used to develop this question:

NMP-OS-007-001, Conduct of Operations Standards and Expectations, **Ver. 16.2**

67. G2.1.19 001/05601X75SPDS/056.002.C.02/BANK/SYS-B/BOTH/G2.1.19/3/F/2/ARB/ABG

You are requested to determine the current status of rod positions using the Safety Parameter Display System (SPDS) one (1) minute after a scram signal.

Which ONE of the following indications would be displayed on SPDS if one control rod was stuck at position 24?

Primary display indicates __________ .

A.✓ the word "Scram" in red indication.

B. the words "All Rods In" in yellow indication.

C. the word "Scram" in orange indication.

D. the words "All Rods In" in red indication.

67. G2.1.19 001

Description:

Each parameter field and status indicator is color coded so the operator can quickly determine the safety conditions that exist without actually reading parameter values.

1) Green - parameter is within its normal operating range.

2) Yellow - potential instrument problem or a p**arameter cannot be verified**. This color prompts the operator to call up the diagnostic page for that parameter so the individual instruments may be monitored for problem determination.

3) Red - off-normal condition exists or the displayed parameter is outside the normal operating range. A parameter in red suggests immediate operator attention.

4) Orange - Off-normal condition exists in which an automatic system is armed or is demanded to actuate to correct or mitigate the condition.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to use SPDS (plant computer) to evaluate all rods in (system status).

"A" is Correct.

The "B" distractor is plausible since yellow represents a potential instrument problem or a parameter cannot be verified, therefore, since all rods in cannot be verified, the applicant selecting "All Rods In" in yellow.

The "C"distractor is plausible since it would be correct if asking for less than 10 seconds since scram signal.

The "D"distractor is plausible since the reactor is analyzed with one control rod fully withdrawn.

67. G2.1.19 001

References provided to the applicant:

NONE

K/A:

2.1 Conduct of Operations

G2.1.19 Ability to use plant computers to evaluate system or component status.
(CFR: 41.10 / 45.12) 3.9 3.8

LESSON PLAN/OBJECTIVE:

H-LT-LP-X75-SPDS-05601, Safety Parameter Display System, **Ver. 8.0**, EO 056.002.C.02

Reference(s) used to develop this question:

34SO-X75-002-1, Operation Of SPDS Equipment, **Ver. 2.12**
34SO-X75-002-2, Operation Of SPDS Equipment, **Ver. 5.1**
Bank question from HLT Database which was used on 2005 Hatch NRC Exam Q#66

68. G2.2.2 001/01201C51SRM/H-OP-90000.015/MOD/P-NORM/BOTH/G2.2.2/3/F/3/ARB/ABG

IAW 34GO-OPS-001-2, Plant Startup, which ONE of the choices below completes the following statements?

Prior to criticality, if the SRM count rate has doubled four (4) times, Single notch rod withdrawal __________ REQUIRED.

The EARLIEST listed condition when the SRM detectors are REQUIRED to be FULLY withdrawn from the core is __________ .

A. is;
after the IRM Range 6 to 7 overlap is confirmed for ALL operable IRMs

B.✓ is;
when all operable IRMs are above Range 3 but before reaching Range 7

C. is NOT;
after the IRM Range 6 to 7 overlap is confirmed for ALL operable IRMs

D. is NOT;
when all operable IRMs are above Range 3 but before reaching Range 7

68. G2.2.2 001

Description:

IAW 34GO-OPS-001-2,

NOTE after step 7.2.17 contains:

Single notch withdrawal is required prior to criticality after the SRM count rate for the quadrant in which the selected control rod being withdrawn has reached **four (4) doublings** of the count rate recorded in step 7.2.13 with the following exceptions:

> Continuous control rod withdrawal is permitted when pulling a control rod between notch 30 and 48 OR Reactor Engineer has confirmed the notch worth is low allowing for continuous withdrawal.

Step 7.2.23 states: "WHEN all operable IRM channels are above range 3 AND PRIOR to reaching range 7, fully withdraw all operable SRM detectors."

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant when notch rod withdrawal (manipulate controls) is required based on the doubling of SRM count rate and when to fully withdraw the SRM detectors (designated power level).

The "A" distractor is plausible since the first part is correct. The second part is plausible since it would be correct if asking the next item to be performed after SRMs are fully withdrawn.

"B" is Correct.

The "C" distractor is plausible since it would be correct if asking the thumb rule for when the reactor can be called critical. The second part is plausible since it would be correct if asking the next item to be performed after SRMs are fully withdrawn.

The "D" distractor is plausible since it would be correct if asking the thumb rule for when the reactor can be called critical. The second part is plausible since it is correct.

68. G2.2.2 001

References provided to the applicant:

NONE

K/A:

2.2 Equipment Control

G2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
(CFR: 41.6 / 41.7 / 45.2) 4.6 4.1

LESSON PLAN/OBJECTIVE:

C51-SRM-LP-01201, SRMs, **Ver. 8.1**, LO H-OP-90000.015

Reference(s) used to develop this question:

34GO-OPS-001-2, Plant Startup, **Ver. 50.0**
Modified from 2015 Browns Ferry RO NRC Exam Q#69

ORIGINAL QUESTION

Unit 1 Plant Startup is in progress in accordance with 1-GOI-100-1A, Unit Startup.

When is control rod withdrawal limited to single notch withdrawal and when may it be discontinued?

A.✓ When the fourth SRM count rate doubling is reached and when the IRMs are on Range 7.

B. When the fifth SRM count rate doubling is reached and when the IRMs are on Range 7.

C. When the fourth SRM count rate doubling is reached and when the IRM/APRM overlap is verified.

D. When the fifth SRM count rate doubling is reached and when the IRM/APRM overlap is verified.

69. G2.2.3 001/01001C71/300.008.A.02/BANK/P-NORM/BOTH/G2.2.3/3/F/2/ARB/ABG

Which ONE of the following scram signals has a DIFFERENT initiation setpoint between Unit 1 and Unit 2?

A. Drywell High Pressure

B. Reactor Vessel High Pressure

C. Reactor Vessel Low Water Level

D.✓ Scram Discharge Volume High Water Level

69. G2.2.3 001

Description:

34AR-603-101-1, SCRAM DISCH VOL HIGH LEVEL TRIP,	**63 gallons**
34AR-603-101-2, SCRAM DISCH VOL HIGH LEVEL TRIP,	**57 gallons**
34AR-603-105-1, REACTOR VESSEL HIGH PRESSURE TRIP,	1074 psig
34AR-603-105-2, REACTOR VESSEL HIGH PRESSURE TRIP,	1074 psig
34AR-603-106-1, PRIMARY CNMT HIGH PRESSURE TRIP,	1.85 psig
34AR-603-106-2, PRIMARY CNMT HIGH PRESSURE TRIP,	1.85 psig
34AR-603-108-1, REACTOR VESSEL LOW LEVEL TRIP,	+3 inches
34AR-603-108-2, REACTOR VESSEL LOW LEVEL TRIP,	+3 inches

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the procedural difference between Unit 1 & Unit 2 RPS Scram setpoints.

The "A"distractor is plausible since this is one of the RPS Scram signal setpoints, however, the setpoint is the same for both Units.

The "B"distractor is plausible since this is one of the RPS Scram signal setpoints, however, the setpoint is the same for both Units.

The "C"distractor is plausible since this is one of the RPS Scram signal setpoints, however, the setpoint is the same for both Units.

"D" is Correct.

69. G2.2.3 001

References provided to the applicant:

NONE

K/A:

2.2 Equipment Control

G2.2.3 (multi-unit license) Knowledge of the design, procedural, and operational differences between units. (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12) 3.8 3.9

LESSON PLAN/OBJECTIVE:

C71-RPS-LP-01001, Reactor Protection System (RPS), **Ver. 9.3**, EO 300.008.A.02

Reference(s) used to develop this question:

34AR-603-101-1, SCRAM DISCH VOL HIGH LEVEL TRIP, **Ver. 5.2**
34AR-603-101-2, SCRAM DISCH VOL HIGH LEVEL TRIP, **Ver. 4.0**

34AR-603-105-1, REACTOR VESSEL HIGH PRESSURE TRIP, **Ver. 4.1**
34AR-603-105-2, REACTOR VESSEL HIGH PRESSURE TRIP, **Ver. 4.1**

34AR-603-106-1, PRIMARY CNMT HIGH PRESSURE TRIP, **Ver. 5.1**
34AR-603-106-2, PRIMARY CNMT HIGH PRESSURE TRIP, **Ver. 5.1**

34AR-603-108-1, REACTOR VESSEL LOW LEVEL TRIP, **Ver. 4.1**
34AR-603-108-2, REACTOR VESSEL LOW LEVEL TRIP, **Ver. 3.2**

Bank question from HLT Database which was used on 2005 Hatch NRC Exam Q#71

70. G2.2.17 001/10002N40/017.025.A.01/NEW/P-NORM/BOTH/G2.2.17/3/F/4/ARB/ABG

Unit 2 is operating at 100% RTP.

A planned maintenance activity resulted in the **Unit 2** EX2100 Regulator Control being placed in MANUAL.

Based on the above conditions and IAW 34SO-N40-001-2, Main Generator Operation,

A Licensed Plant Operator will be stationed at panel 2H11-P651 with __________ .

If reactor power is required to be lowered as power is REDUCED, the Voltage Regulator setting will have to be __________ to maintain TERMINAL VOLTAGE.

A.✓ NO other duties;
LOWERED

B. NO other duties;
RAISED

C. concurrent duties;
LOWERED

D. concurrent duties;
RAISED

70. G2.2.17 001

Description:

IAW 34SO-N40-001-2, Main Generator Operation, steps:

7.3.2.2 Station a Licensed Plant Operator at panel 2H11-P651 with NO other duties, but to maintain AND monitor the voltage level.

CAUTION

AS LOAD IS DECREASED, THE GENERATOR TERMINAL VOLTAGE WILL INCREASE. WHEN VOLTAGE IS REDUCED TO COMPENSATE FOR THIS, CARE MUST BE EXERCISED TO ENSURE THE GENERATOR REMAINS STABLE.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to have knowledge of managing the risk of placing the Generator voltage regulator in manual and then stationing a Licensed Plant Operator with NO other duties to monitor & maintain voltage.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since this would be correct for a EDG that is not tied to the GRID and the speed beginning to lower.

The "C"distractor is plausible since normally Operators have other concurrent duties and would be correct prior to the voltage regulator being placed in manual. The second part is plausible since it is correct.

The "D"distractor is plausible since normally Operators have other concurrent duties and would be correct prior to the voltage regulator being placed in manual. The second part is plausible since this would be correct for a EDG that is not tied to the GRID and the speed beginning to lower.

70. G2.2.17 001

References provided to the applicant:

NONE

K/A:

2.2 Equipment Control

G2.2.17 Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.
(CFR: 41.10 / 43.5 / 45.13) 2.6 3.8

LESSON PLAN/OBJECTIVE:

H-LT-NL--LP-N40-MG-10002, Main Generator, **Ver. 9.0**, EO 017.025.A.01

Reference(s) used to develop this question:

34SO-N40-001-2, Main Generator Operation, **Ver. 21.1**

71. G2.3.4 001/30008RAD/LT-30008.001/NEW/P-NORM/BOTH/G2.3.4/3/H/3/ARB/ABG

Unit 2 was operating at 100% RTP when an event occurred that resulted in minor fuel failure.

RCIC has tripped on overspeed and is required to be reset locally.

A NPO is being dispatched to reset the RCIC Mechanical Overspeed trip and to monitor RCIC operation locally.

The NPO has a current annual TEDE dose exposure of 1500 mrem.

The following general area radiation levels exist:

- o U2 NE Diagonal 800 mrem/hr
- o U2 NW Diagonal 1000 mrem/hr
- o U2 SE Diagonal 1200 mrem/hr
- o U2 SW Diagonal 1400 mrem/hr

Based on the above conditions and IAW NMP-HP-001, Radiation Protection Standard Practices,

Assuming NO extensions are approved and WITHOUT exceeding the Hatch TEDE Adminstrative limit, the MAXIMUM listed STAY time for the NPO in the RCIC Diagonal, is __________ .

A. 36 minutes

B✓ 29 minutes

C. 24 minutes

D. 20 minutes

71. G2.3.4 001

Description:

IAW NMP-HP-001;

4.2.6 Administrative Annual TEDE Dose Limits and the Approval Authority Necessary to Exceed Limits

a. **2000** mrem in a year requires RP Superintendent or RP Manager approval.
b. 4000 mrem in a year requires Plant Manager approval.
c. 4500 mrem in a year requires Site Vice President approval.

Unit 1 RCIC is in the Southwest Diagonal.
Unit 1 HPCI is in the Noutheast Diagonal.
Unit 2 RCIC is in the Nouthwest Diagonal.
Unit 2 HPCI is in the Southeast Diagonal.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the stay time without exceeding the administrative radiation exposure limit based on different areas of the plant.

The "A" distractor is plausible if the applicant chooses the U2 NE Diagonal (2000 mr - 1500 mr = 500 mr) and then (500 mr / 800 mr = 0.625 X 60 minutes) = 37.5 minute stay time.

"B" is Correct. U2 NW Diagonal (2000 mr - 1500 mr = 500 mr) and then (500 mr / 1000 mr = 0.5 X 60 minutes) = 30 minute stay time.

The "C" distractor is plausible if the applicant chooses the U2 SE Diagonal (2000 mr - 1500 mr = 500 mr) and then (500 mr / 1200 mr = 0.4167 X 60 minutes) = 25.0 minute stay time.

The "D"distractor is plausible if the applicant chooses the U2 SW Diagonal (2000 mr - 1500 mr = 500 mr) and then (500 mr / 1400 mr = 0.357 X 60 minutes) = 21.4 minute stay time.

71. G2.3.4 001

References provided to the applicant:

NONE

K/A:

2.3 Radiation Control

G2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions.
(CFR: 41.12 / 43.4 / 45.10) 3.2 3.7

LESSON PLAN/OBJECTIVE:

LT-LP-30008, Radiation Control Administration and Implementation, **Ver. 9.1**,
LO LT-30008.001

Reference(s) used to develop this question:

NMP-HP-001, Radiation Protection Standard Practices, **Ver. 6.2**

72. G2.3.7 001/30008RAD/M30008.003/BANK/P-NORM/BOTH/G2.3.7/3/F/2/ARB/ABG

Unit 2 is operating at 100% RTP.

A major leak in the RWCU A Pump Room ocurred. An operator is entering the area to determine the leaking component.

The following exist:

- o The pump has been shutdown and isolated
- o Radiation levels in the area are 1080 mr/hr

Based on the above conditions and IAW NMP-HP-206, Issuance, Use, and Control of Radiation Work Permits, to enter the RWCU A Pump Room:

The operator will be REQUIRED to log in on a __________ RWP.

A continuous Radiation Protection (RP) escort __________ be REQUIRED.

A.✓ red;
will

B. red;
will NOT

C. yellow;
will

D. yellow;
will NOT

72. G2.3.7 001

Description:

NMP-HP-206, Issuance, Use, and Control of Radiation Work Permits, **Table 1**:

A **red** RWP will be used when the area is posted as a High Radiation Area with **RP** coverage normally **intermittent**.

A **yellow** RWP will be used when the area is posted as a Locked High Radiation Area or Very High Radiation Area with c**ontinuous RP** coverage.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the type of RWP to sign in on and the RP coverage requirement prior to the entry of a radiological controlled area.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since it would be correct if the area was posted only as a high radiation area where RP coverage is normally intermittent but not required.

The "C" distractor is plausible since it would be correct if the area was posted as only a high radiation area (Yellow). The second part is correct.

The "D" distractor is plausible since it would be correct if the area was posted as only a high radiation area (Yellow). The second part is plausible since it would be correct if the area was posted only as a high radiation area where RP coverage is normally intermittent but not required.

72. G2.3.7 001

References provided to the applicant:

NONE

K/A:

2.3 Radiation Control

G2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10) 3.5 3.6

LESSON PLAN/OBJECTIVE:

LT-LP-30008, Radiation Control Adminstration Procedures And Instrumentation, **Ver. 9.1**, LO LT-30008.003

Reference(s) used to develop this question:

NMP-HP-206, Issuance, Use, and Control of Radiation Work Permits, **Ver. 5.1**
Bank question from HLT Database

73. G2.3.11 001/20325SCRR/201.082.A.01/BANK/P-EOP/BOTH/G2.3.11/3/F/3/ARB/ABG

Which ONE of the below choices is the purpose for restarting the Turbine Building (TB) Ventilation when executing 31EO-EOP-014-2, SC Secondary Containment Control - RR Radioactivity Release Control?

Restarting the TB Ventilation __________ **AND** assures a release from the TB Ventilation System is monitored prior to exiting the __________ .

A. preserves personnel accessibility;
Main Stack

B.✔ preserves personnel accessibility;
Reactor Building Stack

C. maintains equipment operability;
Main Stack

D. maintains equipment operability;
Reactor Building Stack

73. G2.3.11 001

Description:

Continued personnel access to the turbine building may be essential for responding to emergencies or transients which may degrade into emergencies. The turbine building is not an air-tight structure. A radioactivity release inside the turbine building would limit personnel access and eventually lead to an unmonitored ground level release. Operation of the turbine building ventilation system: helps preserves turbine building accessibility, AND assures that radioactivity in turbine building areas is discharged through a monitored release point. (Discharged to the reactor building stack).

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to know where the Turbine Building exhaust release point is occurring and the reason why restarting the ventilation is required.

The "A" distractor is plausible since the first part is correct. The second part is plausible if the applicant remembers that SBGT system discharges to the Main Stack and since the Turbine Building Ventilation will be processing the TB atmosphere, that it will discharge to the Main Stack as well.

"B" is correct.

The "C" distractor is plausible if the applicant thinks that since there is equipment that may be operated in the Turbine Building then equipment operability is the reason. The second part is plausible if the applicant remembers that SBGT system discharges to the Main Stack and since the Turbine Building Ventilation will be processing the TB atmosphere, that it will discharge to the Main Stack as well.

The "D" distractor is plausible if the applicant thinks that since there is equipment that may be operated in the Turbine Building then equipment operability is the reason. The second part is plausible since it is correct.

73. G2.3.11 001

References provided to the applicant:

NONE

K/A:

2.3 Radiation Control

G2.3.11 Ability to control radiation releases.
(CFR: 41.11 / 43.4 / 45.10) 3.8 4.3

LESSON PLAN/OBJECTIVE:

EOP-SCRR-LP-20325, Secondary Containment / Radioactivity Release Control, **Ver. 3.0**
EO 201.082.A.01
P63-TBCW-05001, Turbine Building Chilled Water & HVAC, **Ver. 3.0**, LO-90000.010

Reference(s) used to develop this question:

31EO-EOP-014-2, Secondary Containment Control - Radioactivity Release Control, **Ver 11.0**
Bank question from HLT Database which was used on 2015 HLT-9 NRC Exam Q#70

74. G2.4.2 001/20308RC/201.093.A.01/NEW/P-EOP/BOTH/G2.4.2/3/F/3/ARB/ABG

Which ONE of the choices below completes the following statements?

Any setpoint that automatically CLOSES the valve 2E11-F015A, RHR Inboard Injection, __________ an <u>Entry condition</u> to the RC (Non-ATWS) EOP flowchart.

Any setpoint that automatically TRIPS the 2G41-C001, Fuel Pool Cooling Pump, __________ an <u>Entry condition</u> to the SC EOP flowchart.

A. is;
is

B.✓ is;
is NOT

C. is NOT;
is

D. is NOT;
is NOT

74. G2.4.2 001

References provided to the applicant:

NONE

K/A:

2.4 Emergency Procedures / Plan

G2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. (CFR: 41.7 / 45.7 / 45.8) 4.5 4.6

LESSON PLAN/OBJECTIVE:

EOP-RC-LP-20308, RPV Control (NON-ATWS), **Ver. 3.0**, EO 201.093.A.01

Reference(s) used to develop this question:

34SO-G41-003-2, Fuel Pool Cooling And Cleanup System, **Ver. 28.0**
34SO-E11-010-2, Residual Heat Removal System, **Ver. 43.0**

74. G2.4.2 001

Description:

2G41-C001, Fuel Pool Pump auto trips at set point 8 psig suction pressure which is approximately 18 inches in the Skimmer Surge Tank. The bottom of the Skimmer Surge Tank weir is 22 ft 1 inch. Fuel Pool level will stop overflowing to the Skimmer Surge tank but the EOP SC/RR entrycondition on Fuel Pool level is 22 ft 0.5 inch.

2E11-F015A, RHR Inboard Injection, is a Group 2 PCIV when the 2E11-F008 & 2E11-F009 valves are open and will automatically isolate on High Drywell Pressure 1.85 psig or Low RWL 3 inches. Both are EOP entrys.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant which automatic action setpoint is associated with an EOP entry condition.

The "A" distractor is plausible since the first part is correct. The second part is plausible since the Skimmer Surge Tank will continue to lower until the FPC pump trips on low suction and the applicant equating this to the fuel pool entry condition.

"B" is Correct.

The "C" distractor first part is plausible since there are PCIVs that isolate without exceeding an EOP entry condition (Group 5, RWCU at 140°F NRHX inlet temp.) The second part is plausible since the Skimmer Surge Tank will continue to lower until the FPC pump trips on low suction and the applicant equating this to the fuel pool entry condition.

The "D" distractor first part is plausible since there are PCIVs that isolate without exceeding an EOP entry condition (Group 5, RWCU at 140°F NRHX inlet temp.). The second part is correct.

75. G2.4.13 001/10023CDM/LT-10023.001/MOD/P-NORM/BOTH/G2.4.13/3/F/2/ARB/ABG

Unit 1 is operating at 100% RTP when the following occurs:

- o RPV pressure reaches 1080 psig
- o Drywell pressure is 0.8 psig
- o ALL "BLUE" Scram Lights are EXTINGUISHED

Based on the above conditions and IAW NMP-OS-007, Conduct of Operations, how should the OATC respond?

A. Notify the Unit 1 SS of the condition and await direction.

B.✔ Initiate a manual scram and announce the action to the Unit 1 SS.

C. Notify the Unit 1 SS of the condition, recommend a manual scram, and await direction to insert the manual scram.

D. Allow time for another NPO to validate the condition, then initiate a manual scram and announce the action to the Unit 1 SS.

75. G2.4.13 001

Description:

IAW NMP-OS-007, OATC Responsibilites,

3.17.2.d. Ensure the reactor is shut down when:

(1) Safety of the reactor is in jeopardy, or
(2) **Operating parameters exceed any of the reactor protection system trip set points and automatic reactor trip does not occur**, or
(3) Personnel or equipment safety require it, or
(4) Unusual circumstances warrant it.

RPV pressure at 1080 psig should result in a full RPS actuation.
The OATC will shutdown Unit 1 **without permission** from the SS.

IAW NMP-GM-005-002, PEER checks will be used for all Main Control Room (MCR) equipment manipulations (should not preclude actions necessary to mitigate a transient). Exceptions shall be documented on this attachment and approved by the Operations Director (no designee) and maintained by operations.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the proper action to take since an EOP entry condition into RC/A flowchart exists and the reactor is above 5% RTP.

The "A" distractor is plausible since when a critical parameter milestone is reached, the operator will notify the Unit 1 SS and then wait for guidance from the SS to continue (establishing new milestone).

"B" is correct.

The "C"distractor is plausible since NPOs will recommend to the SS EOP overrides to be performed and then waits for the SS to evaluate plant conditions and then wait on the determination before proceeding.

The "D"distractor is plausible since IAW NMP-GM-005-002 directs all Control Room manipulations to be Peer Checked prior to manipulation, therefore waiting for confirmation from another NPO.

75. G2.4.13 001

References provided to the applicant:

NONE

K/A:

2.4 Emergency Procedures / Plan

G2.4.13 Knowledge of crew roles and responsibilities during EOP usage.
(CFR: 41.10 / 45.12) 4.0 4.6

LESSON PLAN/OBJECTIVE:

LT-LP-10023, Industry Events: Conservative Decision Making, **Ver. 8.0**, LO LT-10023.001

Reference(s) used to develop this question:

34AR-603-210-1, APRM/OPRM TRIP, **Ver. 4.6**
NMP-GM-005-002, Human Performance Tools Instruction, **Ver. 6.1**
NMP-OS-007, Conduct of Operations, **Ver. 12.0**
NMP-OS-007-001, Conduct of Operations Standards and Expectations, **Ver. 16.2**
Modified for Hatch from Grand Gulf Nuclear Station LOT 309 RO Exam Q#74, K/A #G2.4.13

ORIGINAL QUESTION

The plant is operating at rated power when the following occurs:

- Drywell pressure reaches 1.25 psig
- Reactor water level lowers to +11”
- No automatic scram has occurred

Per EN-OP-115, Conduct of Operations, how should the ACRO respond?

A. Notify the CRS of the condition and await direction.

B. Notify the CRS of the condition, recommend a manual scram, and await direction to insert the manual scram.

C.✓ Initiate a manual scram and announce the action to the CRS.

D. Allow time for another RO to validate the condition, then initiate a manual scram and announce the action to the CRS.

76. 211000G2.2.12 001/30005TS/300.005.A.18/MOD/P-TS/SRO/211000G2.2.12/2/1/H/2/ABG/ARB

Unit 2 is starting up with the Reactor Mode Switch in Startup / Hot Standby.

Which ONE of the choices below completes the following statements?

IAW 34SV-C41-002-2, Standby Liquid Control Pump Operability Test, if any of the test parameters fall in the "ALERT" range then the pump __________ REQUIRED to be immediately declared INOPERABLE.

IAW TS 3.0.4, without performing a risk assessment, if a Standby Liquid Control Pump is declared INOPERABLE the Reactor Mode Switch __________ be transferred to "RUN"

A. is;
can still

B. is;
can NOT

C. is NOT;
can still

D.✓ is NOT;
can NOT

76. 211000G2.2.12 001

Description:

34SV-C41-002-2, Residual Heat Removal Pump Operability.

4.3 Special Requirements

4.3.3

IF any of the test parameters fall in the "ALERT" range, the pump test frequency must be doubled until the cause of the deviation is determined and the condition is corrected.

IF any of the test parameters fall in the "ACTION" range,
the pump must be declared inoperable until either the cause of the deviation has been determined and the condition is corrected, or an analysis of the pump is performed and new reference values are established. In EITHER case, corrective action will be taken AND documented in the Test Results Section.

LCO 3.0.4 When an LCO is not met, entry into a mode or other specified condition in the Applicability shall only be made:

a. When the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time,
b. After performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the MODE or other specified condition in the Applicability, and establishment of risk management actions, if appropriate; exceptions to this specification are stated in the individual Specifications, or
c. When an allowance is stated in the individual value, parameter, or other Specification.

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of the TS 3.0 Limiting Condition for Operation (LCO) Applicability LCO 3.0.4. When an LCO is not met. This is knowledge beyond that of a Reactor Operator.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing that a surveillance pump flow reading in the ALERT range only requires a doubling of the test frequency and is still considered OPERABLE. (Knowledge of surveillance procedures).

The "A" distractor is plausible the first part would be correct if the parameter falls within the

"ACTION" range. The second part is plausible if a risk assement is performed or LCO 3.0.4.c was noted (ie 3.4.6 RCS Activity).

The "B" distractor is plausible the first part would be correct if the parameter falls within the "ACTION" range. The second part is correct.

The "C" distractor is plausible since the first part is correct. The second part is plausible if a risk assement is performed or LCO 3.0.4.c was noted (ie 3.4.6 RCS Activity).

"D" is correct.

76. 211000G2.2.12 001

References provided to the applicant:

NONE

K/A:

211000 Standby Liquid Control System

G2.2.12 Knowledge of surveillance procedures.
(CFR: 41.10 / 45.13) 3.7 4.1

SRO Only because of link to: [10 CFR 55.43(b)(2)]
Facility Operating Limitations in the Technical Specifications and Their Bases

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-C41-SBLC-01101, STANDBY LIQUID CONTROL, **Ver. 8.0**, LO 90000.005
H-LT-LP-30005, TECHNICAL SPECIFICATIONS, **Ver.** LO 300.005.A.18

Reference(s) used to develop this question:

34SV-C41-002-2, Standby Liquid Control Pump Operability Test, **Ver. 24.2**
Unit 2 TS 3.0.4, **ADM No. 194**

Modified from HLT Bank Q#211000G2.2.12-002

ORIGINAL QUESTION

IAW 34SV-C41-002-2, Standby Liquid Control Pump Operability Test.

IF any of the test parameters fall in the "ACTION" range then the pump __________ have to be declared INOPERABLE.

If a pump was declared INOPERABLE it __________ allowable to perform an engineering analysis that establishes new reference values to return the pump to OPERABILITY.

A..✓ does;
is

B. does;
is NOT

C. does NOT;
is

D does NOT;
is NOT

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).

RO knowledge

Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

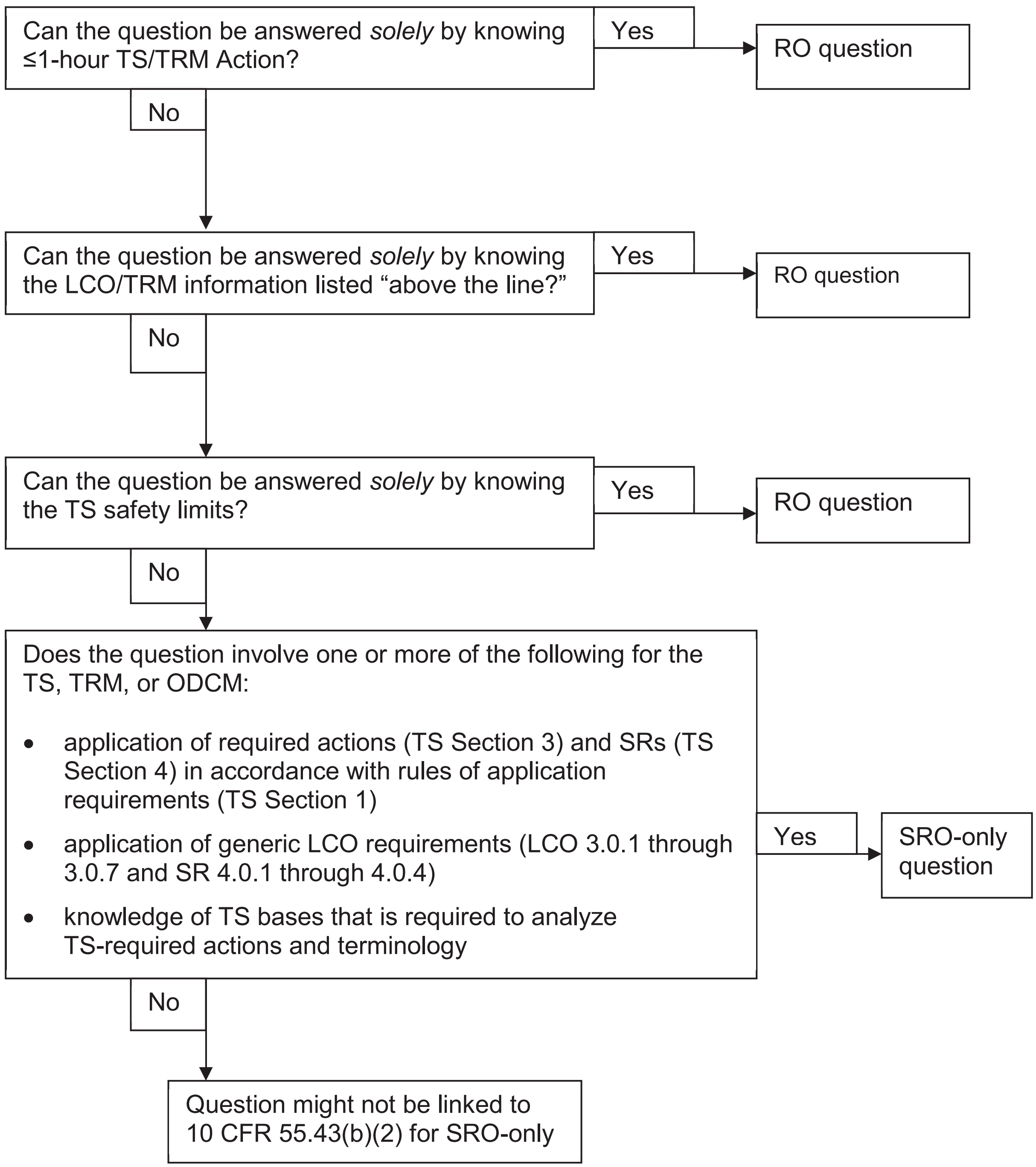
APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

Above this line

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



77. 214000G2.1.28 001/00101C11/90000.007/NEW/ TECH SPEC/SRO/214000G2.1.28/2/2/H/2/ABG/ARB

IAW Tech Spec Bases 3.9.4, Control Rod Position Indication, which ONE of the following completes the following statements concerning the Refueling Interlocks during Refueling operations?

Preventing inadvertent criticality __________ the purpose and function of the full-in position indication channel for each control rod.

The crew __________ ALLOWED to bypass an inoperable full-in position indication channel on a control rod to permit refueling operations to proceed.

A.✓ is;
is

B. is;
is NOT

C. is NOT;
is

D. is NOT;
is NOT

77. 214000G2.1.28 001

Description:

Tech Spec Bases 3.9.4 Control Rod Position Indication

The full-in position indication channel for each control rod provides necessary information to the refueling interlocks to **prevent inadvertent criticalities** during refueling operations. During refueling, the refueling interlocks (LCO 3.9.1 and LCO 3.9.2) use the full-in position indication channel to limit the operation of the refueling equipment and the movement of the control rods. The absence of the full-in position channel signal for any control rod removes the all-rods-in permissive for the refueling equipment interlocks and prevents fuel loading. Also, this condition causes the refuel position one-rod-out interlock to not allow the withdrawal of any other control rod.

ACTIONS

Under these conditions (control rod fully inserted and disarmed), an inoperable full-in channel may be bypassed to allow refueling operations to proceed. An alternate method must be used to ensure the control rod is fully inserted (e.g., use the "00" notch position indication).

Tech Spec Bases B3.1.1 SHUTDOWN MARGIN (SDM)

Also, SDM is assumed as an initial condition for the control rod removal error during refueling (Ref. 4) and fuel assembly insertion error during refueling (Ref. 5) accidents. The analysis of these reactivity insertion events assumes the refueling interlocks are OPERABLE when the reactor is in the refueling mode of operation. These interlocks prevent the withdrawal of more than one control rod from the core during refueling. (Special consideration and requirements for multiple control rod withdrawal during refueling are covered in Special Operations LCO 3.10.6, "Multiple Control Rod Withdrawal - Refueling.") The analysis assumes this condition is acceptable since the core will be shut down with the highest worth control rod withdrawn, if adequate SDM has been demonstrated.

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of the TS bases to decide whether or not bypassing an inoperable full-in position indication channel is allowed. This knowledge is beyond that required of an reactor operator.

K/A JUSTIFICATION:

This question satisfies the K/A statement by applicant knowing the TS bases background information for the full-in position indication channel is to prevent inadvertent criticalities during refueling operation (purpose). This knowledge is beyond that required of an reactor operator.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible if the the affected control rod has not been fully inserted and disarmed.

The "C" distractor is plausible since the safety analysis for the control rod withdrawal error during refueling assumes adequate SDM and the applicant applying this information to the full-in position indication for each rod. The second part is correct.

The "D" distractor is plausible since the safety analysis for the control rod withdrawal error during refueling assumes adequate SDM and the applicant applying this information to the full-in position indication for each rod. The second part is plausible if the the affected control rod has not been fully inserted and disarmed.

77. 214000G2.1.28 001

References provided to the applicant:

NONE

K/A:

214000 Rod Position Information System

G2.1.28 Knowledge of the purpose and function of major system components and controls.
(CFR: 41.7) 4.1 4.1

SRO Only because of link to: [10 CFR 55.43(b)(2)]
Facility Operating Limitations in the Technical Specifications and Their Bases

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-C11-00101, Control Rod Drive System, **Ver. 12.0**, LO 90000.007

Reference(s) used to develop this question:

Unit 1/2 Bases 3.9.4, Control Rod Position Indication, **Rev. 0/96**

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

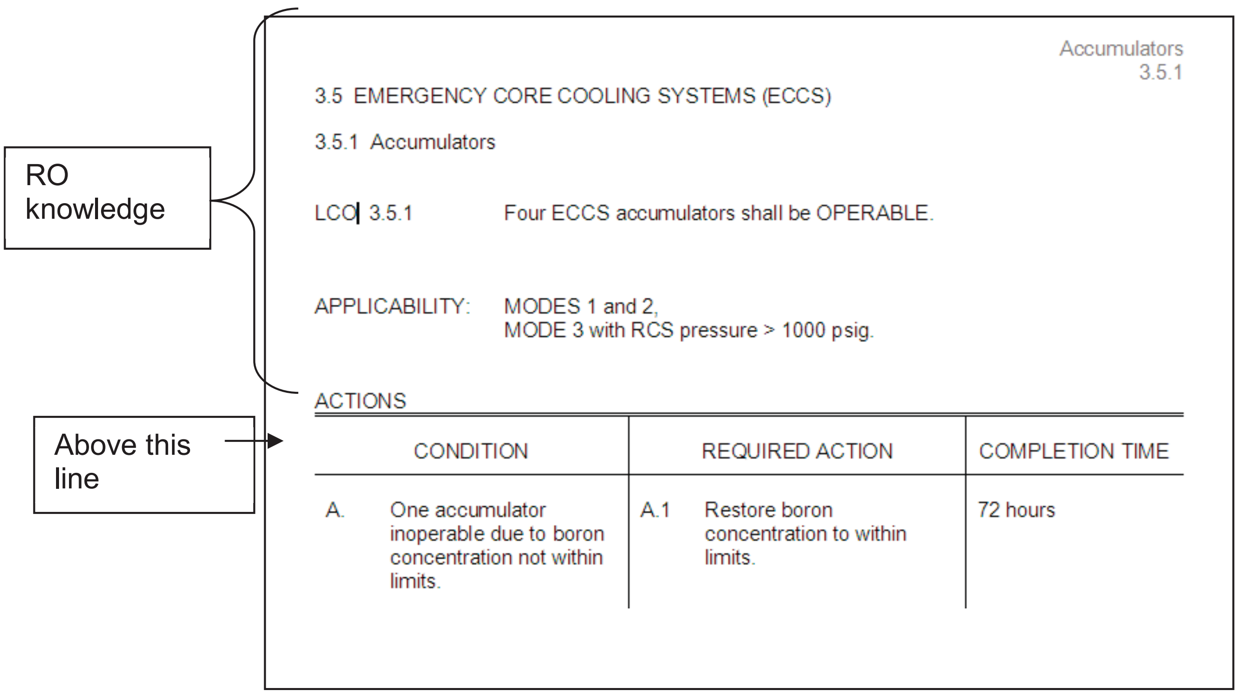
B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).



Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

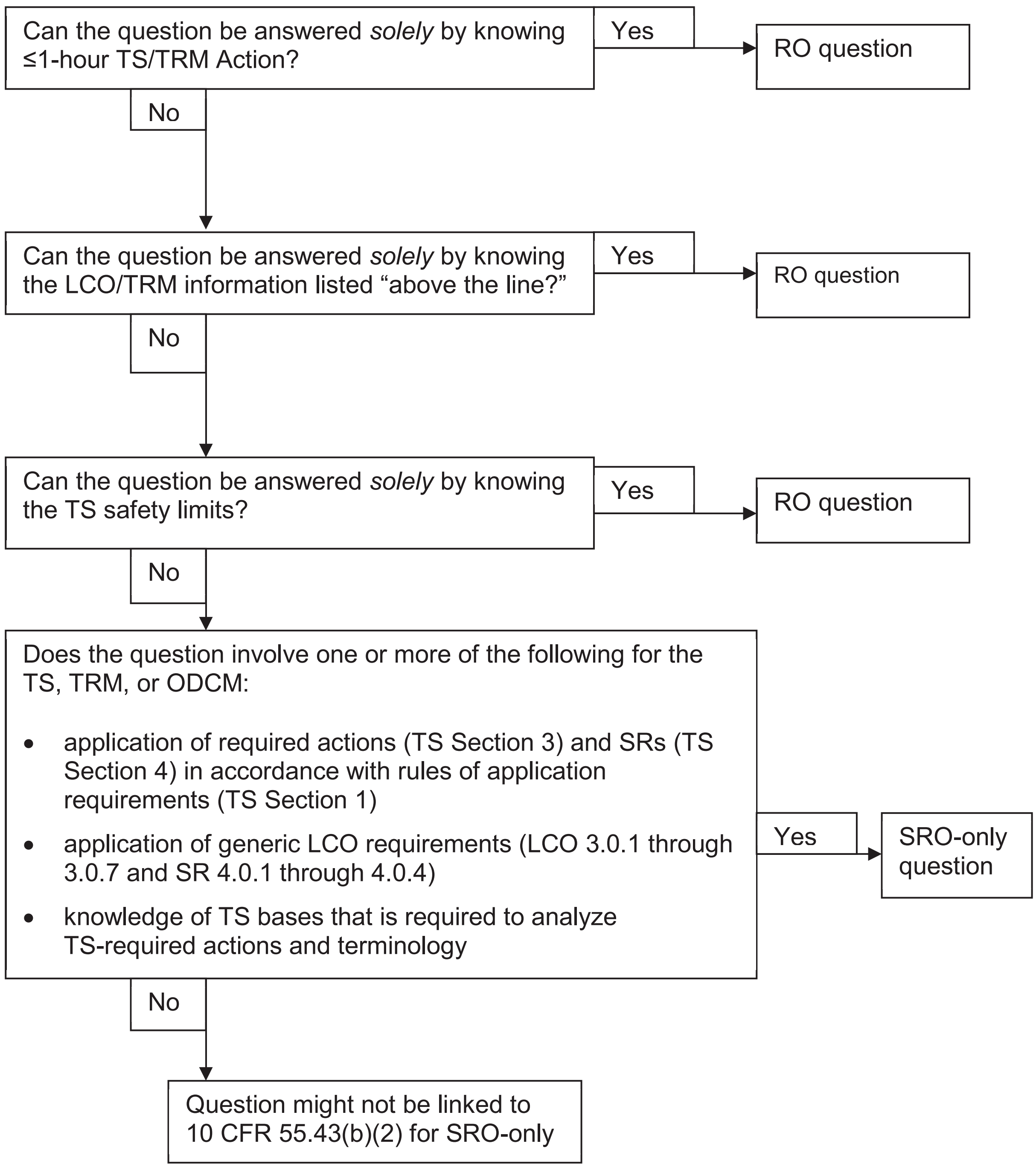
LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



78. 215003G2.1.23 001/01202C51/90000.007/MOD/P-TS/SRO/215003G2.1.23/2/1/H/3/ABG/ARB

Unit 2 is in MODE 2 performing a Plant Startup IAW 34GO-OPS-001-2, Plant Startup.

Based on the above conditions, which ONE of the choices below completes the following statements?

IAW 34GO-OPS-001-2, the MINIMUM number of IRMs REQUIRED to be operable in Mode 2 is __________ .

IAW TS Bases 3.3.1.1, RPS Instrumentation, the bases for the IRM function is to ensure __________ .

A. AT LEAST 3 IRMs per RPS trip system;
peak fuel energy depositions are below the failure threshold

B. AT LEAST 3 IRMs per RPS trip system;
the MCPR SAFETY limit is not exceeded

C✓ ONLY 1 IRM channel in each core quadrant;
peak fuel energy depositions are below the failure threshold

D. ONLY 1 IRM channel in each core quadrant;
the MCPR SAFETY limit is not exceeded

78. 215003G2.1.23 001

Description:

Bruno, this was a Pre-submittal SRO question. Changes were incorporated based on your ES-401-9 comments.

34GO-OPS-013-2, Normal Plant Shutdown, requires 3 IRM channels per RPS TRIP SYSTEM Precaution 2.1.3
A minimum of six IRM channels must be OPERABLE for the control rod block instrumentation to be considered OPERABLE.

34GO-OPS-001-2, Plant Startup, allows 1 IRM channel per quadrant Precaution 5.1.3
A minimum of four IRM channels must be operable for the control rod withdrawal block instrumentation to be considered operable. **One channel in each quadrant of the core must be OPERABLE whenever the IRMs are required to be OPERABLE.** Both the RWM and a second Licensed Operator must verify compliance with the withdrawal sequence when less than three channels in any trip system are OPERABLE.

Unit 2 TS Bases 3.3 Instrumentation

This analysis, which assumes that one IRM channel in each trip system is bypassed, demonstrates that the IRMs provide protection against local control rod withdrawal errors and results in **peak fuel energy depositions** below the 170 cal/gm fuel failure threshold criterion. Recent analysis which shows that, even with two IRMs operable per trip system, adequate protection is provided for reactivity events in the intermediate range.

MCPR TRUE FOR APRM
The Average Power Range Monitor Simulated Thermal Power - High Function provides protection against transients where THERMAL POWER increases slowly (such as the loss of feedwater heating event) and protects the fuel cladding integrity by ensuring that the MINIMUM CRITICAL POWER RATIO (MCPR) Safety Limit (SL) is not exceeded.

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of Unit 2 TS Bases for the protection provided by IRM channels. This is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by applicant knowing how the results of IRM FT surveillances (specific system procedure) relate to the continued performance of the Plant Startup procedure with regards to the requirement for operable IRMs. (integrated plant procedures during all modes of plant operation).

The "A" distractor is plausible since this is correct per 34GO-OPS-013-2. The second part is correct.

The "B" distractor is plausible since this is correct per 34GO-OPS-013-2. The second part is plausible since it is correct for APRMs.

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since it is correct for APRMs.

78. 215003G2.1.23 001

References provided to the applicant:

NONE

K/A:

215003 Intermediate Range Monitor (IRM) System

G2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6) 4.3 4.4

SRO Only because of link to: [10 CFR 55.43(b)(2)]
Facility Operating Limitations in the Technical Specifications and Their Bases

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-C51-IRM-01202, Intermediate Range Monitors, **Ver. 9.0**, LO 90000.007

Reference(s) used to develop this question:

Unit 2 TS Bases 3.3 RPS Instrumentation, 3.3.1.1 Intermediate Range Monitor Neutron Flux-High, **Rev 37/41**
Modified from HLT-2 2005 NRC EXAM Q#79

ORIGINAL QUESTION

Which ONE of the following is the basis for requiring the minimum number of IRMs to be OPERABLE when the unit is in Mode 2 or Mode 5?

A.✓ To provide protection against local control rod withdrawal errors to prevent exceeding the peak energy fuel failure threshold criterion.

B. Provides protection against transients where thermal power increases slowly and protects the fuel clad by ensuring that the MCPR safety limit is not exceeded.

C. Provides a backup to the Rod Worth Minimizer system by preventing an out of sequence control rod withdrawal during low power conditions.

D. Ensures the rate of power increase in any part of the core during startup conditions is monitored and prevented from exceeding the analyzed thermal limits.

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

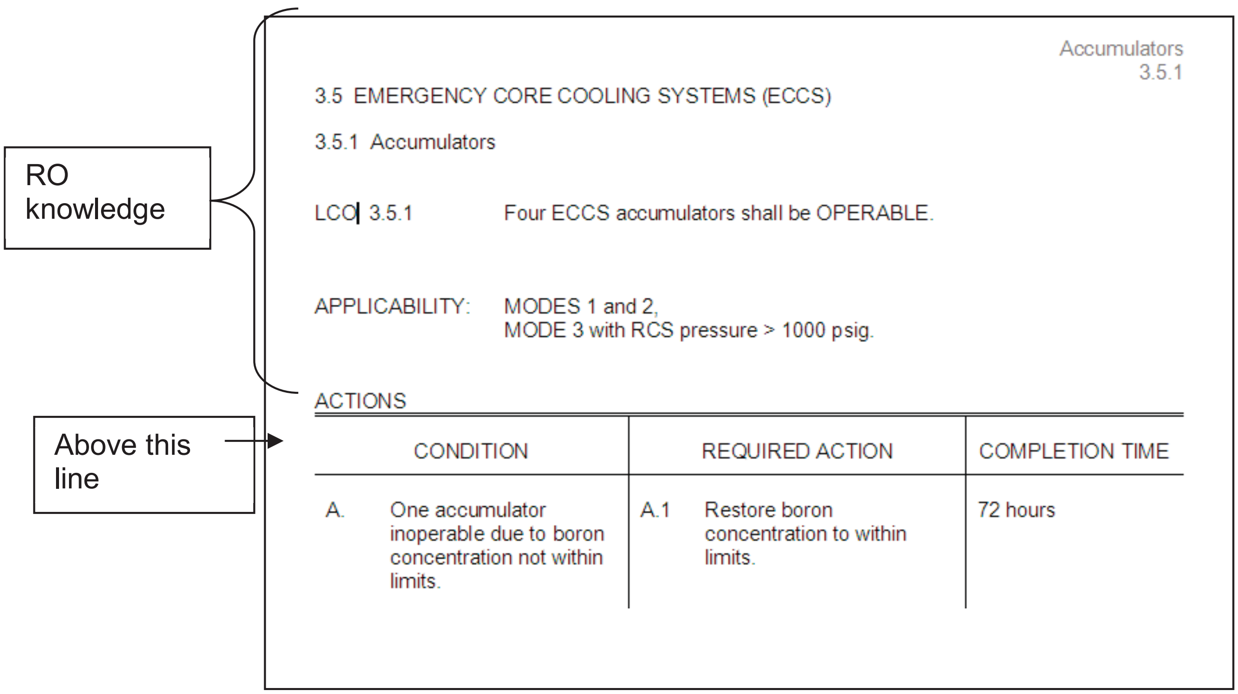
B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).



Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)

Can the question be answered *solely* by knowing ≤1-hour TS/TRM Action?
- Yes → RO question
- No ↓

Can the question be answered *solely* by knowing the LCO/TRM information listed “above the line?”
- Yes → RO question
- No ↓

Can the question be answered *solely* by knowing the TS safety limits?
- Yes → RO question
- No ↓

Does the question involve one or more of the following for the TS, TRM, or ODCM:

- application of required actions (TS Section 3) and SRs (TS Section 4) in accordance with rules of application requirements (TS Section 1)
- application of generic LCO requirements (LCO 3.0.1 through 3.0.7 and SR 4.0.1 through 4.0.4)
- knowledge of TS bases that is required to analyze TS-required actions and terminology

- Yes → SRO-only question
- No ↓

Question might not be linked to 10 CFR 55.43(b)(2) for SRO-only

79. 216000A2.06 001/00202C32/002.020.A.05/MOD SYS-P/SRO/216000A2.06/2/2/H/3/ABG/ARB

Unit 2 is operating at 100% RTP with the following RWL indications:

- o 2C32-R606A, Narrow Range RWL, 36.5 inches
- o 2C32-R606B, Narrow Range RWL, 37.0 inches
- o 2C32-R606C, Narrow Range RWL, 37.5 inches

Subsequently, the following occurs:

- o Transmitter to Instrument 2C32-R606B loses power
- o FEEDWATER CONTROL SYSTEM TROUBLE, 603-132 ILLUMINATED

Based on the above conditions, which ONE of the choices below completes the following statements?

2C32-R608, Reactor Level/Pressure Recorder, will be using __________ as the MEDIAN signal.

The specific step to toggle the PF1 button on 2C32-K648, Median Level Signal Processor, which will cutout all annunciator inputs from this processor to annunicator 603-132 is contained in __________ .

A. 2C32-R606A;
34AB-N21-002-2, FEEDWATER/ REACTOR WATER LEVEL CONTROL ISSUES

B.✓ 2C32-R606A;
34AR-603-132-2, FEEDWATER CONTROL SYSTEM TROUBLE

C. 2C32-R606C;
34AB-N21-002-2, FEEDWATER/ REACTOR WATER LEVEL CONTROL ISSUES

D. 2C32-R606C;
34AR-603-132-2, FEEDWATER CONTROL SYSTEM TROUBLE

79. 216000A2.06 001

Description:

Upon a loss of power to an instrument, the remote indication fails downscale.

FEEDWATER CONTROL SYSTEM TROUBLE, 603-132

2C32-R608 Median level deviation of ± 3 inches

5.5 IF alarm is caused from an instrument in step 6.2, 6.3, OR 6.4 (as determined by any PF1, PF2, OR PF3 light ILLUMINATED), toggle PF1 button on appropriate controller to ILLUMINATE PF4 light AND reset annunciator. This action will cutout all annunciator inputs from this controller. (Refer to placard posted at 2H11-P612)

5.5.1 Once the cause of alarm from step 5.5 has been corrected, confirm PF1, PF2, and PF3 lights are EXTINGUISHED, AND toggle PF1 button on appropriate controller to EXTINGUISH PF4 light AND restore controller annunciator function.

6.0 Causes
6.2 Defiation from the normal set point on one of the following 2H11-P612 instruments: **2C32-K648**, 2C32-K649, 2C32-K650, 2C32-K651 or recorder 2C32-R608

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of procedural steps to aid in selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. This knowledge is beyond that required of an reactor operator.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing that when the "B" reactor water level instrument lost power it failed downscale making the "A" instrument the median RWL (predict). The steps to remove the 2C32-K648 output to the 603-132 annunciator, which allows the annunciator to respond to any other RWLC event, are located in the ARP.(procedure steps to mitigate)

The "A" distractor is plausible since the first part is correct. The second part is plausible because ARP 603-132 is listed as entry condition for 34AB-N21-002-2 and is also used to correct RWL controller issues.

"B" is correct.

The "C" distractor is plausible since this would be correct if the instrument failed upscale. The second part is plausible because ARP 603-132 is listed as entry condition for 34AB-N21-002-2 and is also used to correct RWL controller issues.

The "D" distractor is plausible since this would be correct if the instrument failed upscale. The second part is correct.

79. 216000A2.06 001

References provided to the applicant:

NONE

K/A:

216000 Nuclear Boiler Instrumentation

A2. Ability to (a) predict the impacts of the following on the NUCLEAR BOILER INSTRUMENTATION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6)

A2.06 Loss of power supply 2.9 3.1

SRO Only because of link to: [10 CFR 55.43(b)(5)]
Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations.

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-B21-RXINS-04404, Reactor Vessel Instrumentation, **Ver. 8.0**, LO 90000.001
H-LT-NL-LP-C32-RWLC,00202, Reactor Water Level Control, **Ver. 7.0,** LO 002.020.A.05

Reference(s) used to develop this question:

FEEDWATER CONTROL SYSTEM TROUBLE, 603-132, **Ver. 4.10**
Modified from Hatch HLT Bank Q#259002K3.07-002

ORIGINAL QUESTION

Unit 2 is operating at 100% RTP with the following RWL indications:

- o 2C32-R606A indication: +37.0 inches
- o 2C32-R606B indication: +36.6 inches
- o 2C32-R606C indication: +36.9 inches

An instrument issue causes 2C32-R606A & C to begin drifting up slowly (1 inch/min).

With NO operator action,

The C32-R608, Reactor Level/ Pressure Recorder will __________ .

A. remain relatively unchanged, at approximately +36.6 inches, since RWLC System immediately transferred control to 2C32-R606B

B. trend up continuously as soon as 2C32-R606A & C begin drifting up until upscale

C. trend up until 2C32-R606A & C are 5 inches away from 2C32-R606B and then display the 2C32-R606B value

D.✓ trend up until 2C32-R606A & C are 10 inches away from 2C32-R655 and then display the 2C32-R606B value

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)

Can the question be answered *solely* by knowing "systems knowledge" (i.e., how the system works, flowpath, logic, component location)?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry into major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following:

- assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed
- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event-specific sub-procedures or emergency contingency procedures
- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

80. 261000A2.15 001/03001T46/030.006.A.01/BANK/ PROC/SRO/261000A2.15/2/1/H/3/ABG/ARB

Unit 2 is operating at 100% RTP with fuel movement in progress to load a cask when minor damage to a fuel bundle resulted in the following conditions:

- o The ARM on the Unit 2 Refueling Bridge starts ALARMING
- o Refueling Floor Area Radiation Monitors indicate:
  - o 2D21-K601M - 70 mRem/hr
  - o 2D21-K611K - 65 mRem/hr
  - o 2D21-K611L - 70 mRem/hr
- o Refueling Floor HVAC Exhaust Radiation Monitors indicate:
  - o 2D11-K634A - 15 mRem/hr
  - o 2D11-K634B - 14 mRem/hr
  - o 2D11-K634C - 18 mRem/hr
  - o 2D11-K634D - 19 mRem/hr

Based on the above conditions and IAW 31EO-EOP-014-2, Secondary Containment Control, flowchart,

The TOTAL number of Unit 1 and Unit 2 Standby Gas Treatment Systems (SBGT) that will automatically start is __________ .

The MINIMUM required procedure(s) to be entered is __________ .

Reference Provided

A. ONLY two (2);

34AB-D11-001-2, Radioactivity Release Control ONLY

B. ONLY two (2);

34AB-D11-001-2, Radioactivity Release Control
AND
34GO-OPS-013-2, Normal Plant Shutdown

C.✓ four (4);

34AB-D11-001-2, Radioactivity Release Control ONLY

D. four (4);

34AB-D11-001-2, Radioactivity Release Control
AND
34GO-OPS-013-2, Normal Plant Shutdown

80. 261000A2.15 001

Description:

There are 12 Refuel Floor Process Radiation monitors on Unit 2.

Setpoints:

- o 2D11-K634A-D rad monitors for U2 .... 6.9 mR/hr
- o 2D11-K635A-D rad monitors for U2 .... 5.7 mR/hr
- o 2D11-K611A-D rad monitors for U2 .... 18 mR/hr

With all 4 of the 2D11-K634 rad monitors above the setpoint, all 4 SBGT systems will auto start.

34AB-T22-003-2 Secondary Containment Control, directs the entry into 34AB-D11-001-2 Radioactivity Release Control, which dictates that an Offsite Dose Assessment must be performed NMP-EP-147.

SRO JUSTIFICATION:

The SRO is required to be able to assess plant conditions and then have deatiled knowledge of 31EO-EOP-014-2 to select the procedure or section of a procedure to mitigate the event. This is beyond that knowledge of a reactor operator.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing the result of a high radiation on the refueling bridge and the Unit 2 refueling floor vent exhaust radiation levels and the response to both Units SBGT trains (predict). Then based on the refuel floor area radiation levels enter the correct procedures to mitigate the event (procedure use).

The "A" distractor is plausible since the system operating procedure will direct one SBGT train to be placed in off. The second part is correct.

The "B" distractor is plausible since the system operating procedure will direct one SBGT train to be placed in off. The second part is plausible if area radiaion levels exceeded MAXIMUM SAFE OPERATING levels.

"C is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible if area radiaion levels exceeded MAXIMUM SAFE OPERATING levels.

80. 261000A2.15 001

References provided to the applicant:

Unit 2, Table SC-1.4 of SC flowchart with ONLY the ARM portion,
DO NOT PROVIDE HVAC EXHAUST SETPOINTS

K/A:

261000 Standby Gas Treatment System

A2. Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
(CFR: 41.5 / 45.6)

A2.15 High area radiation by refuel bridge: Plant-Specific 3.0 3.4

SRO Only because of link to: [10 CFR 55.43(b)(5)]
Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations.

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T46-SBGT-03001, Standby Gas Treatment, **Ver. 7.0**, LO 030.006.a.01

Reference(s) used to develop this question:

34SO-T46-001-2, Standby Gas Treatment System, **Ver. 15.2**
34AB-T22-003-2, Secondary Containment Control, **Ver. 4.3**
34AB-D11-001-2 Radioactivity Release Control, **Ver. 1.9**

Bank question from HLT Database used on 2009 HLT 5 NRC EXAM Q#80

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

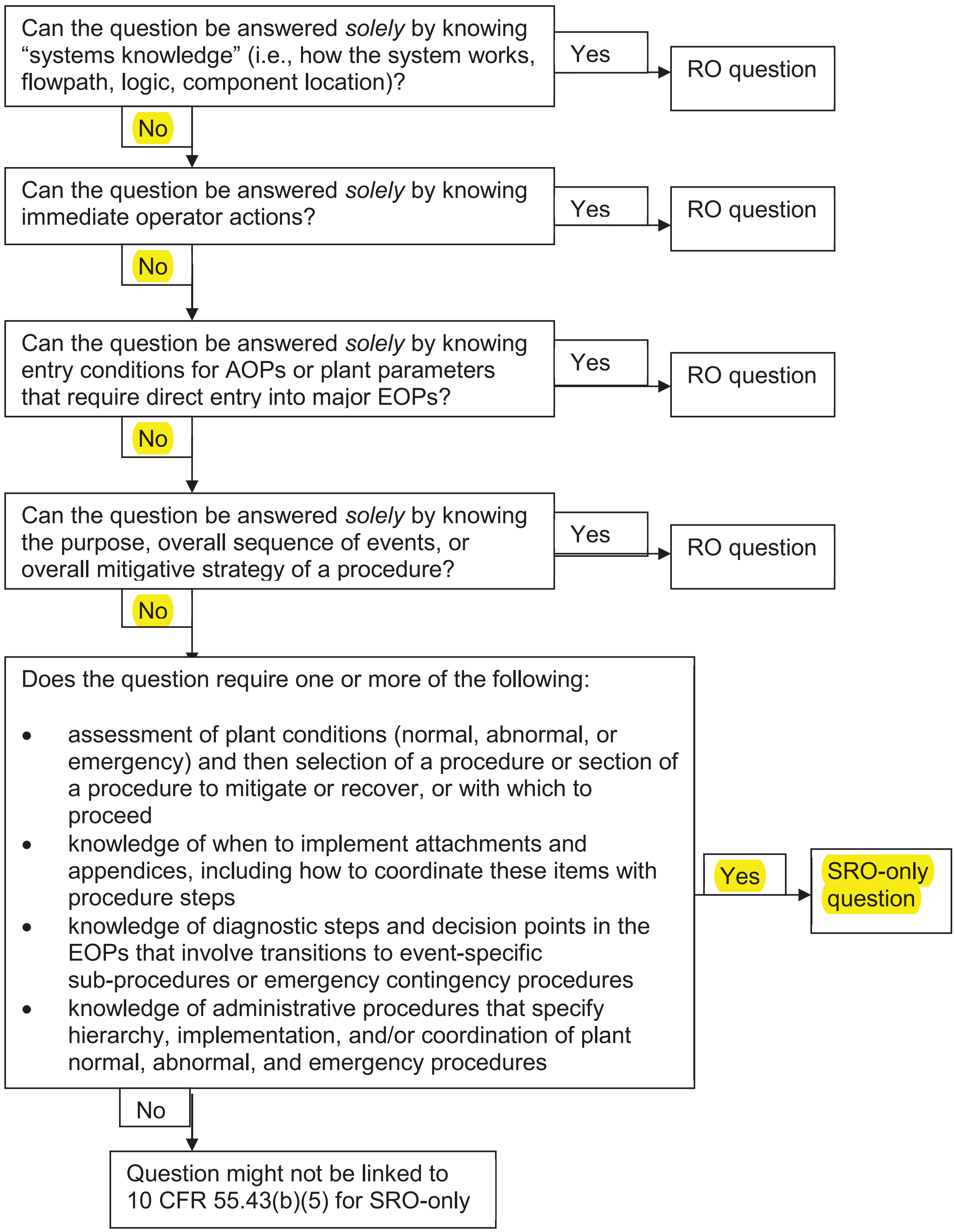
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)



81. 264000A2.10 001/02801R43/90000.004/NEW/P-NORM/SRO/264000A2.10/2/1/H/3/ABG/ARB

Unit 2 is operating at 100% RTP with 34SV-R43-006-2, Diesel Generator 2C Semi-Annual Test, in progress with the following conditions:

- o EDG 2C Mode Select switch is in TEST
- o EDG 2C has not been started

Before EDG 2C is started, a LOCA signal is received on **Unit 2**.

Based on the above conditions, which ONE of the choices below completes the following statements?

EDG 2C __________ AUTOMATICALLY start.

After EDG 2C is running, if it is desired to shutdown EDG 2C from the Control Room with the LOCA signal still present, jumpers will be installed IAW _________ .

A. will;
34AB-R43-001-2, Diesel Generator Recovery

B✔ will;
34SO-R43-001-2, Diesel Generator Standby AC System

C. will NOT;
34AB-R43-001-2, Diesel Generator Recovery

D. will NOT;
34SO-R43-001-2, Diesel Generator Standby AC System

81. 264000A2.10 001

Description:

Bruno, this was a Pre-submittal SRO question. Changes were incorporated based on your ES-401-9 comments.

The following conditions will take a DG out of the TEST Mode:

(1) **LOCA**
(2) Loss of 4160V BUS Alternate Supply SAT
(3) Loss of 4160V BUS Normal Supply SAT if the Normal Supply SAT is de-energized with the Diesel Gen DIESEL TEST SAT OUT OF SVC INTERLOCK SWITCH in the TEST position.

34SO-R43-001-2, Diesel Generator Standby AC System

5.1.3 Operation of the Diesel Generator at no OR low loads (<30%, ~840 Kw) for extended periods of time, may result in oil accumulation in the exhaust manifold due to insufficient gas flows and temperature to vaporize the oil.

IF one of the EDG's is operated for an extended period of time (>12 hrs) at no load or low load (<30%, ~840 Kw), then the shift will consider the following options to limit the oil accumulation in the exhaust manifold:

IF the Diesel Generator is operating unloaded, then consider **shutting the EDG down**.

5.2.9 Energizing a diesel generator's Test Relays results in the following:
Locks out associated diesel generator emergency start

7.2.3.5 Diesel Generator 2C Manual Shutdown

7.2.3.5.1 At the direction of the SS, IF desired to shut down the Diesel Gen 2C **with an auto start signal present** which can NOT be reset, **THEN install jumpers per Attachment 8**.

Attachment 8, contains the steps for jumper installation to allow the DG 2C to be shut down from the control room.

34AB-R43-001-2, Diesel Generator Recovery
4.2 LOCA AND LOSP ACTIONS

1. IF concurrent LOCA AND LOSP signals are present on both units, THEN perform the following:
   a. At the 1B D/G room, TRIP 1B D/G by depressing the EMERGENCY STOP pushbutton.
   b. Coordinate actions with Unit 1 Shift Supervisor to determine WHICH unit receives 1B D/G.
      (1) IF Unit 1 will receive the 1B D/G, at panel 2H11-P652, Bay B, **OPEN link TB6-26 (12T2) to REMOVE** Unit 2 LOCA AND LOSP signals. Sign off Attachment 1 Step 4.a for link OPEN.

SRO JUSTIFICATION:

The SRO is required to be able to assess plant conditions and then have detailed knowledge of 34SO-R43-001-2 and 34AB-R43-001-2 procedures to select the procedure or section of a procedure to mitigate the event. This is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing a LOCA signal will take EDG 2C out of test and should have automatically started (Predict) then use 34SO-R43-001-2 to remove the automatic LOCA start signal (use procedures) to allow Control Room actions to shutdown the EDG 2C.

The "A" distractor is plausible because the first part is correct. The second part is plausible since 34AB-R43-001-2 has steps to remove the Unit 2 LOCA AND LOSP automatic start signals from the EDG 1B circuitry.

"B" is Correct.

The "C" distractor is plausible because with the Diesel Gen Mode Select Switch in the TEST position the EDG will be incapable of automatically starting. The second part is plausible since 34AB-R43-001-2 has steps to remove the Unit 2 LOCA AND LOSP automatic start signals from the EDG 1B circuitry.

The "D" distractor is plausible because with the Diesel Gen Mode Select Switch in the TEST position the EDG will be incapable of automatically starting. The second part is correct.

81. 264000A2.10 001

References provided to the applicant:

NONE

K/A:

264000 Emergency Generators (Diesel/Jet)

A2. 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: (CFR: 41.5 / 45.6)

A2.10 LOCA. 3.9 4.2*

SRO Only because of link to: [10 CFR 55.43(b)(5)]
Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations.

LESSON PLAN/OBJECTIVE:

R43-EDG-LP-02801, EMERGENCY DIESEL GENERATOR , **Ver. 9.1**, LO 90000.004, LO 90000.003

Reference(s) used to develop this question:

34SO-R43-001-2, Diesel Generator Standby AC System, **Ver. 30.1**
34AB-R43-001-2, Diesel Generator Recovery, **Ver. 6.0**
34SV-R43-006-2, Diesel Generator 2C Simi-Annual Test, **Ver. 18.0**
34SV-R43-003-2, Diesel Generator 2C Monthly Test, **Ver. 25.0**

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)

Can the question be answered *solely* by knowing "systems knowledge" (i.e., how the system works, flowpath, logic, component location)?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry into major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following:

- assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed
- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event-specific sub-procedures or emergency contingency procedures
- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

82. 272000A2.16 001/01302T22/300.006.C.03/NEW/TECH SPECS/SRO/272000A2.16/2/2/H/3/ARB

UNIT 2 is operating at 100% RTP.

The **Unit 2** Reactor Building Vent Exhaust radiation monitors, 2D11-K609A, B, C & D, surveillance test is being performed on the last Tech Spec allowable day to complete the surveillance.

While testing 2D11-K609A, I&C personnel report that 2D11-K609A will NOT provide a trip signal.

2D11-K609A is declared inoperable.

At SS direction, I&C personnel proceed with testing of 2D11-K609B.

IAW Unit 2 TS and based on the above conditions, while I&C personnel have 2D11-K609B in an INOPERABLE status to continue testing,

The Isolation/Initiation Capability for the Reactor Building Exhaust radiation-high Function __________ being maintained.

Entry into a TS Required Action Statement for 2D11-K609B __________ be DELAYED up to 6 hours.

Reference Provided

A.✓ is still;
can

B. is still;
can NOT

C. is NOT;
can

D. is NOT;
can NOT

82. 272000A2.16 001

Description:

IAW TS 3.3.6.2, Secondary Containment Isolation Instrumentation, the Reactor Building Exhaust Radiation High function requires 2 channels per trip systems A and B.

Trip System A has channels A1/A2
Trip System B has channels B1/B2

Actual trip circuitry cross ties A1 and B1, A2 and B2, to cause an actuation.

2D11-K609A is A1
2D11-K609B is B1
2D11-K609C is A2
2D11-K609D is B2

With 2D11-K609A and 2D11-K609B unable to cause a trip the **function is still maintained**. See LFD-2-SCIS-03

IAW Tech Specs SR 3.0.1:
SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. **Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO.**

IAW Tech Specs LCO 3.3.6.2: Surveillance NOTE
2. When a channel is placed in an inoperable status solely for the performance of required surveillance, entry into associated Conditions and Required Actions may be delayed up to 6 hours **provided the associated Function maintains trip capability**.

SRO JUSTIFICATION:

The SRO is required to have knowledge of Surveillance Requirements in accordance with rules and notes of application requirements. This knowledge beyond that required of a Reactor Operator.

K/A JUSTIFICATION:

This question satisfies the K/A statement by applicant knowing that if 2D11-K609A and 2D11-K609B unable to cause a trip the function is still maintained (predicting.) Then appling the note in surveillance section of TS 3.3.6.2 allowing the delay in entering Condition and Required Actions.

"A" is correct

The "B" distractor is plausible since the first part is correct. The second part is plausible if the instrument was inoperable for a reason other than the surveillance and if function capability was not maintained.

The "C" distractor is plausible since this would be correct for either instruments (A and C) or (B and D) being unable to cause a trip. The second part is correct. The first part and second part agreement is plausible because there are LCOs with the 6 hour delay not requiring functionality to delay the LCO entry (TS 3.3.3.2 Remote Shutdown Panel, TS 3.7.9 Turbine Building Ventilation Exhaust System Fans).

The "D" distractor is plausible since this would be correct for either instruments (A and C) or (B and D) being unable to cause a trip.

82. 272000A2.16 001

References provided to the applicant:

U2 LFD-2-SCIS-03 WITHOUT INFOMATION BELOW THE DOUBLE LINE

K/A:

272000 Radiation Monitoring System

A2. Ability to (d) predict the impacts of the following on the RADIATION MONITORING SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
(CFR: 41.5 / 45.6)

A2.16 Instrument malfunctions 2.7 2.9

SRO Only because of link to: [10 CFR 55.43(b)(2)]
Facility Operating Limitations in the Technical Specifications and Their Bases

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T22-SC-01302, Secondary Containment, **Ver. 9.0**, LO 300.006.C.03

Reference(s) used to develop this question:

Unit 2, TRM LFD-2-SCIS-03, **Rev. 0**
Unit 2 TS 3.3.6.2, Secondary Containment Isolation Instrumentation, **Amd. 266**

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).

RO knowledge

Above this line

Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

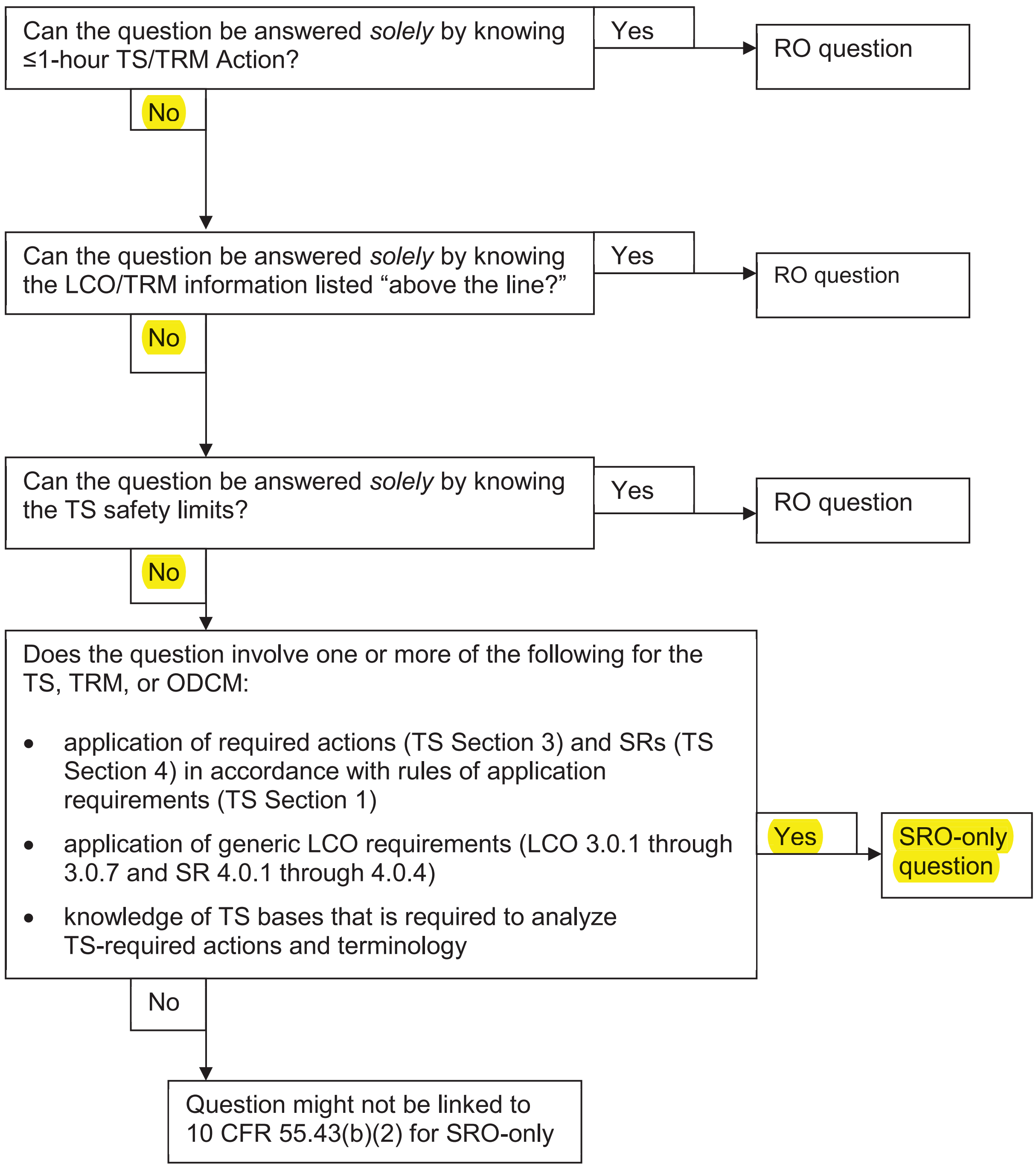
LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



83. 295002AA2.04 001/03101N62/90000.004/MOD/P-AB/SRO/295002AA2.04/1/2/H/2/ARB

Unit 1 is operating at 100% RTP with HPCI Danger Tagged out of service.

A SO reports a leak on the Main Condenser Vacuum Breaker valve piping connected to the Main Condenser. Maintenance is attempting to repair the leak.

Main Condenser Vacuum is degrading.

At 10:00, the following occurs:

- o Reactor is scrammed, 34AB-C71-001-1, Scram Procedure, is entered
- o ALL rods are fully inserted
- o RWL lowers to -110 inches and then is restored with RCIC

At 10:20, the following occurs:

- o Maintenance has REPAIRED the Main Condenser Vacuum Breaker valve piping leak
- o MSIVs are re-opened

Based on the above conditions,

The Main Condenser Vacuum Breaker valve piping leak will INITIALLY cause TOTAL Offgas flow to __________ .

At 10:21, to continue the plant cooldown, the procedure that will be used to open the Main Turbine Bypass Valves is __________ .

A. go up;
31EO-EOP-107-1, Alternate RPV Pressure Control

B✓ go up;
34SO-N30-001-1, Main Turbine Operation

C. lower;
31EO-EOP-107-1, Alternate RPV Pressure Control

D. lower;
34SO-N30-001-1, Main Turbine Operation

83. 295002AA2.04 001

Description:

The air inleakage is drawn out with the gases via the steam jet air ejectors. The gases get recombined but the air passes on through to the off-gas system.

IAW 34AB-C71-001-1,

4.24 IF the MSIVs are CLOSED, THEN perform the following:

4.24.9 IF the MSIVs are NOT closed due to high radiation, THEN, IF desired, **OPEN the MSIVs per 34GO-OPS-001-1**.

31EO-EOP-107-1, Alternate RPV Pressure Control, contains steps to re-open the MSIVs to use the RFPTs, Chest Warming & SJAEs but NOT to re-open to use Bypass valves.

SRO JUSTIFICATION:

The SRO must have detailed knowledge of the Abnormal & EOP procedures. Knowing the content of the abnormal procedure to selecting the correct procedure to mitigate and recover the plant is required SRO knowledge therefore, above the RO level of required knowledge.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing that Main Condenser air inleakage will result in Off Gas system flow going up (determine) during a lowering Main Condenser Vacuum event. The SRO will then select a procedure to mitigate the event based upon abnormal procedure knowledge.

The "A" distractor is plausible since the first part is correct. The second part is plausible because when the EOP flowcharts are entered, 31EO-EOP-107-1 provides alternate methods to control RPV Pressure when normal pressure control methods are not available. EOP-107 does not contain any procedural direction for operating the Main Turbine Bypass Valves.

"B" is Correct.

The "C" distractor is plausible since this would be correct for system leakage from the Off Gas Condenser which is under a positive pressure. The second part is plausible because when the EOP flowcharts are entered, 31EO-EOP-107-1 provides alternate methods to control RPV Pressure when normal pressure control methods are not available. EOP-107 does not contain any procedural direction for operating the Main Turbine Bypass Valves.

The "D" distractor is plausible since this would be correct for system leakage from the Off Gas Condenser which is under a positive pressure. The second part is plausible since it is correct.

83. 295002AA2.04 001

References provided to the applicant:

NONE

K/A:

APE: 295002 Loss of Main Condenser Vacuum

AA2. Ability to determine and/or interpret the following as they apply to LOSS OF MAIN CONDENSER VACUUM : (CFR: 41.10 / 43.5 / 45.13)

AA2.04 Offgas system flow 2.8 2.9

SRO Only because of link to: [10 CFR 55.43(b)(5)]
Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-03101-N62-OG-03101, OFF GAS SYSTEM, **Ver. 8.0**, LO 90000.004

Reference(s) used to develop this question:

31EO-EOP-107-1, Alternate RPV Pressure Control, **Ver. 5.3**
34AB-C71-001-1, Scram Procedure, **Ver. 12.14**
34AB-N61-002-1 Main Condenser Vacuum, **Ver. 1.6**
34AR-650-148-1, Turbine Vacuum Low-Low, **Ver. 5.6**

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, “Changes, Tests and Experiments”
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure’s overall mitigative strategy or purpose.

The applicant’s knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure’s content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using “systems knowledge,” such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

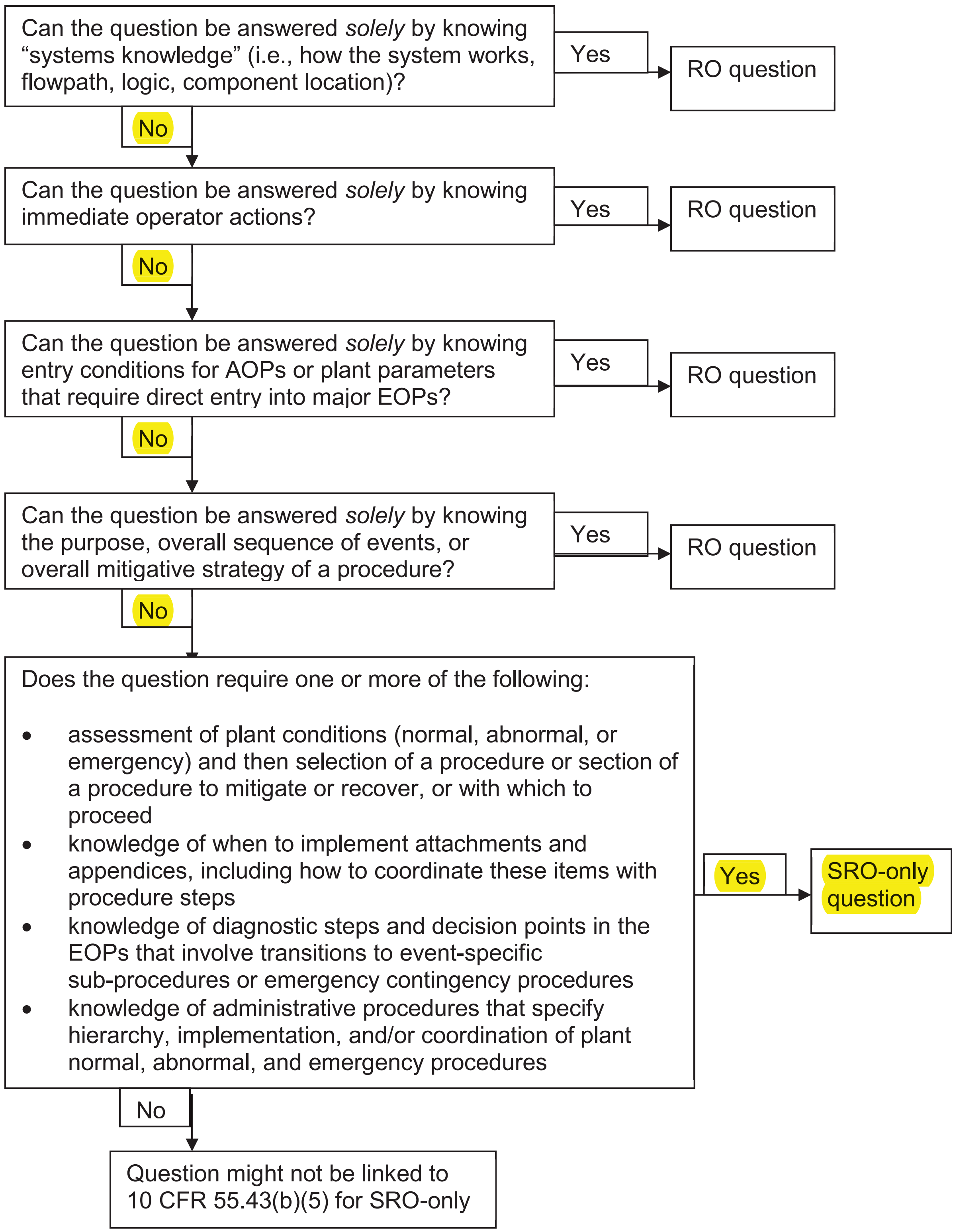
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)



84. 295003G2.1.20 001/02702R22/027.009.A.03/NEW/ P-AB/SRO/295003G2.1.20/1/1/H/3/ABG/ARB

Unit 2 is operating at 90% RTP when the following occurs:

- o 4160 VAC Bus 2C, de-energizes and can NOT be restored
- o 34AB-R22-004-2, Loss of 4160 Bus 2A, 2B, 2C or 2D, is entered

Based on the above conditions, which ONE of the choices below completes the following statements?

The TOTAL number of RFPTs that have AUTOMATICALLY tripped is __________ .

When 4160 VAC Bus 2C is ready to be energized, the specific step to place the Sync Switch in the ON position __________ contained in 34AB-R22-004-2.

A. one (1);
is

B.✔ one (1);
is NOT

C. two (2):
is

D. two (2):
is NOT

84. 295003G2.1.20 001

Description:

34AB-R22-004-**2**, Loss of 4160 Bus 2A, 2B, 2C or 2D

2.0 AUTOMATIC ACTIONS

2.3 **2B RFPT trips** on low oil pressure due to loss of power to its AC oil pumps

34AB-R22-004-**1**, Loss of 4160 Bus 2A, 2B, 2C or 2D

2.0 AUTOMATIC ACTIONS

2.1 A Reactor Scram may occur on Low Level IF EITHER RFPT was in service due to **both RFPT's tripping** on low oil pressure due to loss of power to their respective AC oil pumps.

34SO-R22-001-2, 4160 VAC System Operating Procedure,

7.1.3.2 Energizing 4160 VAC Bus 2C From Unit Aux Xfmr 2A (Normal) Source

7.1.3.2.1 Trip AND confirm that the green lights are lit AND the green switch flags are visible for the following:
ACB 135494 4160V Bus 2C Alternate Supply
ACB 135474 4160V Bus 2C Normal Supply

7.1.3.2.2 Open all the 4160V Bus 2C feeder breakers as listed on Attachment 2 (Load List).

7.1.3.2.3 Confirm 135474/135494 Station Svc Interlock Cutout switch is in NORMAL-(UP).

7.1.3.2.4 **Place Sync Switch (SSW) ACB 135474 in ON**

34AB-R43-001-2, Diesel Generator Recovery

4.7 D/G START WITH 4160V BUS DE-ENERGIZED ACTIONS

(2) To CLOSE Diesel Generator 2C Emergency Supply ACB 135540, perform the following:

(b) On panel 2H11-P652, Place Diesel Generator 2C **Synch Switch (SSW) for ACB 135540 in ON.**

SRO JUSTIFICATION:

The SRO is required to assess abnormal plant conditions (loss 4160 VAC, loss RFPT, loss of cooling to ASDs) and then select the 34SO-R22-001-2, 4160 VAC System Operating Procedure, to recover. This is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant diagnosing that the loss of 4160 VAC 2C will result in loss of a single RFPT (interpret) and executing the specific procedure used to position the Sync Switch (execute procedure steps) for recovering 4160 VAC 2C.

The "A" distractor is plausible since the first part is correct. The second part is plausible since there are other abnormal procedures that contain the step to place the Sync Switch in the ON position (34AB-R43-001-2, Diesel Generator Recovery) to recover a bus.

"B" is Correct.

The "C" distractor is plausible since this would be correct for a loss of Unit 1's 4160 VAC Bus 1C. The second part is plausible since there are other abnormal procedures that contain the step to place the Sync Switch in the ON position (34AB-R43-001-2, Diesel Generator Recovery) to recover a bus.

The "D" distractor is plausible since this would be correct for a loss of Unit 1's 4160 VAC Bus 1C. The second part is correct.

84. 295003G2.1.20 001

References provided to the applicant:

NONE

<u>K/A:</u>

APE: 295003 Partial or Complete Loss of A.C. Power

G2.1.20 Ability to interpret and execute procedure steps.
(CFR: 41.10 / 43.5 / 45.12) 4.6   4.6

SRO Only because of link to: [10 CFR 55.43(b)(5)]
Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations.

<u>LESSON PLAN/OBJECTIVE:</u>

R22-ELECT-LP-02702, 4160 VAC, **Ver. 7.2**, LO 027.009.A.03

<u>Reference(s) used to develop this question:</u>

34SO-R22-001-2, 4160 VAC System Operating Procedure, **Ver. 22.1**
34AB-R22-004-1, Loss of 4160 Bus 2A, 2B, 2C or 2D, **Ver. 2.9**
34AB-R22-004-2, Loss of 4160 Bus 2A, 2B, 2C or 2D, **Ver. 1.11**
34AB-R43-001-2, Diesel Generator Recovery, **Ver. 6.0**
Modified from ILT10 NRC EXAM Q#84 295004G2.1.20-001

ORIGINAL QUESTION

Unit 2 is operating at 100% RTP.

o 2R22-S016, 125/250VDC Switchgear 2A, de-energizes and can NOT be restored
o 34AB-R22-001-2, Loss of DC Buses, is entered by the crew

Based on the above conditions,

A 34GO-OPS-014-2, Fast Reactor Shutdown, __________ REQUIRED.

Upon a trip of the Main Turbine and after TC-1 is complete, to trip the RFPTs, the trip pushbuttons are REQUIRED to be depressed __________ .

A.✓ is;
locally at the RFP front standard

B. is;
on panel 2H11-P650

C. is NOT;
locally at the RFP front standard

D. is NOT;
on panel 2H11-P650

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
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- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

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- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

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The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

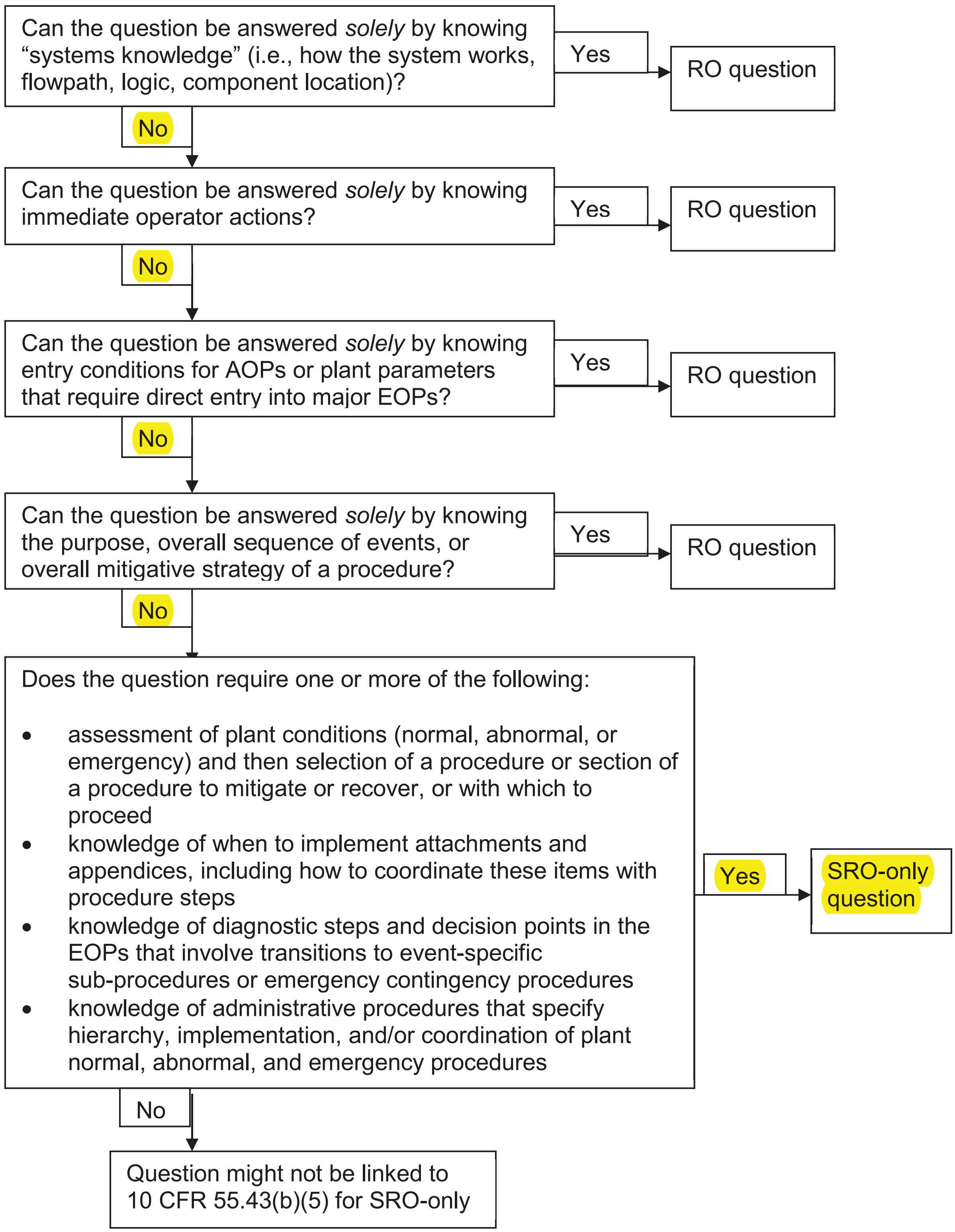
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

**Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)**



85. 295012AA2.01 001/01301PC/300.011.A.12/BANK/ PROC/SRO/295012AA2.01/1/2/H/3/ABG/ARB

Unit 1 is operating at 100% RTP when a loss of Drywell Cooling occurs.

34AB-T47-001-1, Complete Loss of Drywell Cooling, is in progress.

The Drywell temperatures on Attachment 1, Peak Drywell Temperature, are exceeded.

The following Drywell conditions exist:

- o Drywell pressure is being manually controlled between 0.5 psig and 1.2 psig
- o Average Drywell temperature is 190°F

Based on the above conditions,

IAW 34AB-T47-001-1, the MAXIMUM amount of time that the existing Drywell conditions can exist before requiring a fast reactor shutdown is __________ .

IAW Unit 1 TS Bases 3.6.1.5, Drywell Air Temperature, IF a DBA LOCA were to occur, the resultant peak accident temperature __________ EXCEED the Drywell design temperature.

A✓ 30 minutes;
will

B. 30 minutes;
will NOT

C. 60 minutes;
will

D. 60 minutes;
will NOT

85. 295012AA2.01 001

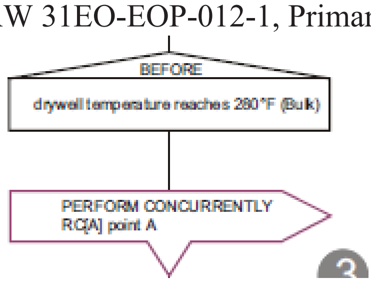
Description:

34AB-T47-001-1 "Complete Loss of DW Cooling" contains a subsequent action that if any of the temperatures are exceeded in Attachment 1, then a 30 minute clock starts for restoring temperatures. If this time limit is exceeded, then a Fast Reactor Shutdown will be initiated per 34GO-OPS-014-1.

PEAK DRYWELL TEMPERATURES

Drywell Elevation	*Temperature Elements	Maximum 30-Minute Temperature (°F)
Upper	1T47-N001A -N001B -N001J -N001K	300°F
Middle	1T47-N003 -N009	240°F
Lower	1T47-N001L -N001M -N004 -N005 -N007 -N008	200°F

IAW 31EO-EOP-012-1, Primary Containment Control:



IAW Unit 1 TS B3.6.1.5 Drywell Air Temperature, In the event of a DBA, with an initial drywell average air temperature **less than or equal to** the LCO temperature limit, the resultant peak accident temperature **is** maintained **below** the drywell design temperature. As a result, the ability of primary containment to perform its design function **is ensured**.

SRO JUSTIFICATION:

The SRO must have detailed knowledge of TS Bases concerning Drywell temperature as to when the design temperature will be exceeded if a DBA were to occur. The SRO must also have detailed knowledge of abnormal procedures and the EOP PC flowchart to know when to shutdown the Unit based on the increasing pressure/temperature environment. The SRO must select which procedure will be directing the shutdown of the Unit. The RO may know that a unit shutdown is required but not which procedure is directing this action.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to know where the direction (procedure selection) is requiring the unit to be shutdown based upon interpreting high Drywell temperatures and pressures. Also satisfies the K/A statement by determining if a DBA were to occur with the higher Drywell temperatures, whether or not the resultant peak accident temperature will be maintained below the Drywell design temperature. This is TS Bases information.

"A" is correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible if the applicant thinks that a Fast Reactor shutdown is required within 30 minutes and does not understand that a Reactor scram is required per the Primary Containment control flowchart prior to reaching 280°F. Even if the 30 minute time limit was exceeded, the EOP PC flowchart would take priority over the abnormal procedure requirements.

The "C" distractor is plausible if the applicant remembers a Drywell temperature limit of 340°F (Unit difference) and that an emergency depress is required prior to exceeding this design temperature and thinks there is sufficient margin that if a DBA were to occur, the resultant peak temperature will be maintained below the Drywell design temperature since it occurs less than the design temperature. Also plausible if the applicant does not consider that the bases for exceeding the design temperature begins with exceeding 150°F. The second part is plausible since it is correct.

The "D" distractor is plausible if the applicant remembers a Drywell temperature limit of 340°F (Unit difference) and that an emergency depress is required prior to exceeding this design temperature and thinks there is sufficient margin that if a DBA were to occur, the resultant peak temperature will be maintained below the Drywell design temperature since it occurs less than the design temperature. Also plausible if the applicant does not consider that the bases for exceeding the design temperature begins with exceeding 150°F. The second part is plausible if the applicant thinks that a Fast Reactor shutdown is required within 30 minutes and does not understand that a Reactor scram is required per the Primary Containment control flowchart prior to reaching 280°F. Even if the 30 minute time limit was exceeded, the EOP PC flowchart would take priority over the abnormal procedure requirements.

85. 295012AA2.01 001

References:
NONE

K/A:

APE: 295012 High Drywell Temperature

AA2. Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : (CFR: 41.10 / 43.5 / 45.13)

AA2.01 Drywell temperature................................... 3.8 3.9

SRO only because of link to 10CFR55.43 (5): Assessment of facility conditions and selection of appropriate procedure, recalling the action in the body of procedure and when to take the action. Also SRO only because this is a detailed knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps.

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T23-PC-01301, Primary Containment, **Ver 10.0**, EO 300.011.A.12

References used to develop this question:

SRO ONLY Guideline
31EO-EOP-012-1, Primary Containment Control, (PC), **Ver. 7.1**
34AB-T47-001-1, Complete Loss of Drywell Cooling,**Ver. 2.4**
Unit 1 TS Bases 3.6.15., Drywell Temperature, **Rev. 108**

Original question from HLT question database used on 2015 ILT-9 NRC exam Q#88

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, “Changes, Tests and Experiments”
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure’s overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)

Can the question be answered *solely* by knowing "systems knowledge" (i.e., how the system works, flowpath, logic, component location)?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry into major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following:

- assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed
- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event-specific sub-procedures or emergency contingency procedures
- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

86. 295018AA2.02 001/30004ADM/300.004.B.02/NEW/P-AB/SRO/295018AA2.02/1/1/H/3/ARB/ABG

Unit 2 is operating at 100% RTP when 34AB-P42-001-2, Loss Of Reactor Building Closed Cooling Water, is entered due to rising temperatures on components cooled by RBCCW.

Subsequently,

At 10:00, RBCCW suction temperature is 100°F and rising at one (1) degree per minute.

Based on the above conditions and IAW NMP-AD-031, SNC Reportability, Responsibilities, and Fleet Requirements, of the times listed below,

The LATEST time for the FIRST report to the NRC Operations Center is __________ .

Reference Provided

A.✓ 14:05

B. 14:40

C. 18:05

D. 18:40

86. 295018AA2.02 001

Description:

Bruno, this was a Pre-submittal SRO question. Changes were incorporated based on your ES-401-9 comments.

IAW 34AB-P42-001-2,

Step 2.2; High process water temperature, **140°F,** out of the Non-regenerative Heat Exchanger isolates the RWCU System, by CLOSING 2G31-F004, Rx Water Cleanup Valve.

Step 4.7; IF any of these conditions exist,

RBCCW flow CANNOT be re-established,

RBCCW suction **temperature** reaches **105°F** as indicated on 2P42-R600, 2H11-P650,

any temperature on Recirc System reaches its alarm setpoint.

Then perform the following:

4.7.1 **Enter** 34AB-C71-001-2, Scram Procedure, AND SCRAM the reactor.

With a scram required at 10:05 **(RBCCW suction temperature reaches 105°F)** and the scram inserted at 10:05, a four (4) hour report will be required at 14:05 IAW NMP-AD-031, Reportable Event SAF 1.6: RPS Actuation, which states "50.72(b)(2)(iv)(B): The licensee shall notify the NRC as soon as practical and in all cases, **within four hours** of the occurrence of … any event or condition that results in **actuation of the reactor protection system (RPS)** when the reactor is **critical** except when the actuation results from and is part of a pre-planned sequence during testing or reactor operation." Also "50.72(b)(3)(iv)(A): The licensee shall notify the NRC as soon as practical and in all cases, **within eight hours** of the occurrence of … any event or condition that results in valid **actuation of any of the systems** listed in paragraph (b)(3)(iv)(B) of this section except when the actuation results from and is part of a pre-planned sequence during testing or reactor operation." 50.72(b)(3)(iv)(B): The systems to which the requirements of paragraph (b)(3)(iv)(A) of this section apply are: …**RPS including: reactor scram and reactor trip**.

IAW NMP-AD-031, RPS Actuation Summary Table,

Reactor Condition	Valid RPS Actuation	Valid RPS Actuation	Invalid RPS Actuation	Invalid RPS Actuation
Critical	4 hr. telephone report	60 day LER report	4 hr. telephone report	60 day LER report
Critical (preplanned)	No report	No report	No report	No report
Not Critical	8 hr. telephone report	60 day LER report	No report	No report*
Not Critical (preplanned)	No report	No report	No report	No report

	telephone report	report		
Not Critical (preplanned)	No report	No report	No report	No report

IAW REPORTABLE EVENT SAF 1.7: System Actuation Not Including RPS,

50.72(b)(3)(iv)(A): The licensee shall notify the NRC as soon as practical and in all cases, **within eight hours** of the occurrence of … any event or condition that results in valid actuation of any of the systems listed in … [§ 50.72(b)(3)(iv)(B)] … except when the actuation results from and is part of a pre-planned sequence during testing or reactor operation.

§ 50.72(b)(3)(iv)(B): The systems to which the requirements of … [§ 50.72(b)(3)(iv)(A)] … apply are:

(1) …

(2) General containment isolation signals affecting containment isolation valves in more than one system or multiple main steam isolation valves …

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of reportability requirements to answer this question. Reportability requirements are above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to interpret cooling water temperature for determination of the latest time for notification requirements to the NRC.

"A" is Correct.

The "B" distractor is plausible since at 10:40 the Recirc Pump ASD A COOLING TROUBLE (603-125) annunciator would alarm (inlet temp > 140°F) requiring a scram per 34AB-P42-001-2 and IAW SAF 1.7 a 4 hour report would be required by 14:40.

The "C" distractor is plausible since 10:05 would be the required time to scram (RPS Actuation) and if the reactor was not critical an 8 hour report would be required by 18:05.

The "D" distractor is plausible since 10:40 is the required time that a containment isolation signal is received for RWCU outboard isolation valve and IAW SAF 1.7 an 8 hour report would be required by 18:40.

86. 295018AA2.02 001

References provided to the applicant:

NMP-AD-031, SNC Reportability Roles, Responsibilities, and Fleet Requirements, Reportable Events: SAF 1.5, 1.6, & 1.7 ONLY

K/A:

APE: 295018 Partial or Complete Loss of Component Cooling Water

AA2. Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : (CFR: 41.10 / 43.5 / 45.13)

AA2.02 Cooling water temperature 3.1 3.2

SRO only because of link to 10CFR55.43(b)(1): Conditions and limitations in the facility license. Reporting requirements.

LESSON PLAN/OBJECTIVE:

LT-LP-30004, Admin Procedures, **Ver. 16.0,** EO 300.004.B.02 (SRO Only)

Reference(s) used to develop this question:

34AB-P42-001-2, Loss Of Reactor Building Closed Cooling Water, **Ver. 2.6**
NMP-AD-031, SNC Reportability, Responsibilities, and Fleet Requirements, **Ver. 9.2**
34AR-601-125-2, ASD A COOLING TROUBLE, **Ver. 5.0**

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

87. 295019AA2.02 001/03801B21/300.011.A.08/BANK/ TS/SRO/295019AA2.02/1/1/F/2/ABG/ARB

Unit 1 is operating at 100% RTP. The ADS air supply header pressure lowers to 60 psig.

Based on the above conditions and IAW Tech Specs SR 3.5.1.3 and Tech Spec Bases,

The LOWEST required pneumatic supply header pressure to the ADS valve accumulators is __________ which ensures the accumulators will accommodate at least _________ valve actuations with the drywell at 70% design pressure.

A. 80 psig;
TWO (2)

B. 80 psig;
FIVE (5)

C✓ 90 psig;
TWO (2)

D. 90 psig;
FIVE (5)

87. 295019AA2.02 001

Description:

IAW TS & Bases, SR 3.5.1.3, Verification every 31 days that ADS air supply header pressure is ≥ **90 psig** ensures adequate air pressure for reliable ADS operation. The accumulator on each ADS valve provides pneumatic pressure for valve actuation. The design pneumatic supply pressure requirements for the accumulator are such that, following a failure of the pneumatic supply to the accumulator, at least two valve actuations can occur with the drywell at 70% of design pressure (Ref. 11). The ECCS safety analysis assumes only one actuation to achieve the depressurization required for operation of the low pressure ECCS. This minimum required pressure of ≥ 90 psig (for one actuation) is provided by the ADS instrument air supply.

80 psig is plausible because this is where the 1P52-F875, Reactor Building Instrument Nitrogen Backup, OPENS to Supply Nitrogen to the Pipe Chase Area. Five actuations is plausible because the EDG receivers (accumulators) have the capacity for five succesive start attempts.

SRO JUSTIFICATION:

The SRO is required to have detailed TS Bases knowledge of the designed pneumatic supply pressure requirements for the accumulator are such that, following a failure of the pneumatic supply to the accumulator, at least two valve actuations can occur with the drywell at 70% of design pressure. This is beyond that of a Reactor Operator.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant knowing when ADS air supply header pressure is ≥ **90 psig** ensures adequate air pressure for reliable ADS operation. (interpret)

The "A" distractor is plausible since 80 psig is where the 1P52-F875, Reactor Building Instrument Nitrogen Backup, OPENS to Supply Nitrogen to the Pipe Chase Area. The second part is correct.

The "B" distractor is plausible since 80 psig is where the 1P52-F875, Reactor Building Instrument Nitrogen Backup, OPENS to Supply Nitrogen to the Pipe Chase Area. The second part is plausible since the EDG receivers (accumulators) have the capacity for five succesive start attempts..

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since the EDG receivers (accumulators) have the capacity for five succesive start attempts.

87. 295019AA2.02 001

References provided to the applicant:

NONE

K/A:

APE: 295019 Partial or Complete Loss of Instrument Air

AA2. Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : (CFR: 41.10 / 43.5 / 45.13)

AA2.02 Status of safety-related instrument air system loads
(see AK2.1 - AK2.19) 3.6 3.7

AK2.18 ADS: Plant-Specific 3.5 3.5

SRO only because of link to 10CFR55.43 (2): Facility operating limitations in the technical specifications and their bases.

LESSON PLAN/OBJECTIVE:

P51-P52-P70-Plant Air-LP-03501, Plant Air Systems, **Ver. 7.0,** EO 042.004.A.01
H-LT-LP-B21-ADS-03801, Automatic Depressurization System (ADS), **Ver. 6.0**
EO 300.011.A.08

Reference(s) used to develop this question:

34AB-P51-001-1, Loss Instrument Air System or
Water Intrusion Into the Service Air System, **Ver. 5.2**
Unit 1 TS & Bases, SR 3.5.1.3, ECCS Operating, **Rev.87**
Bank question which was used on 2009 HLT-5 NRC Exam Q#89

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. <u>Conditions and Limitations in the Facility License</u> [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. <u>Facility Operating Limitations in the Technical Specifications and Their Bases</u> [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).

RO knowledge

Above this line

Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

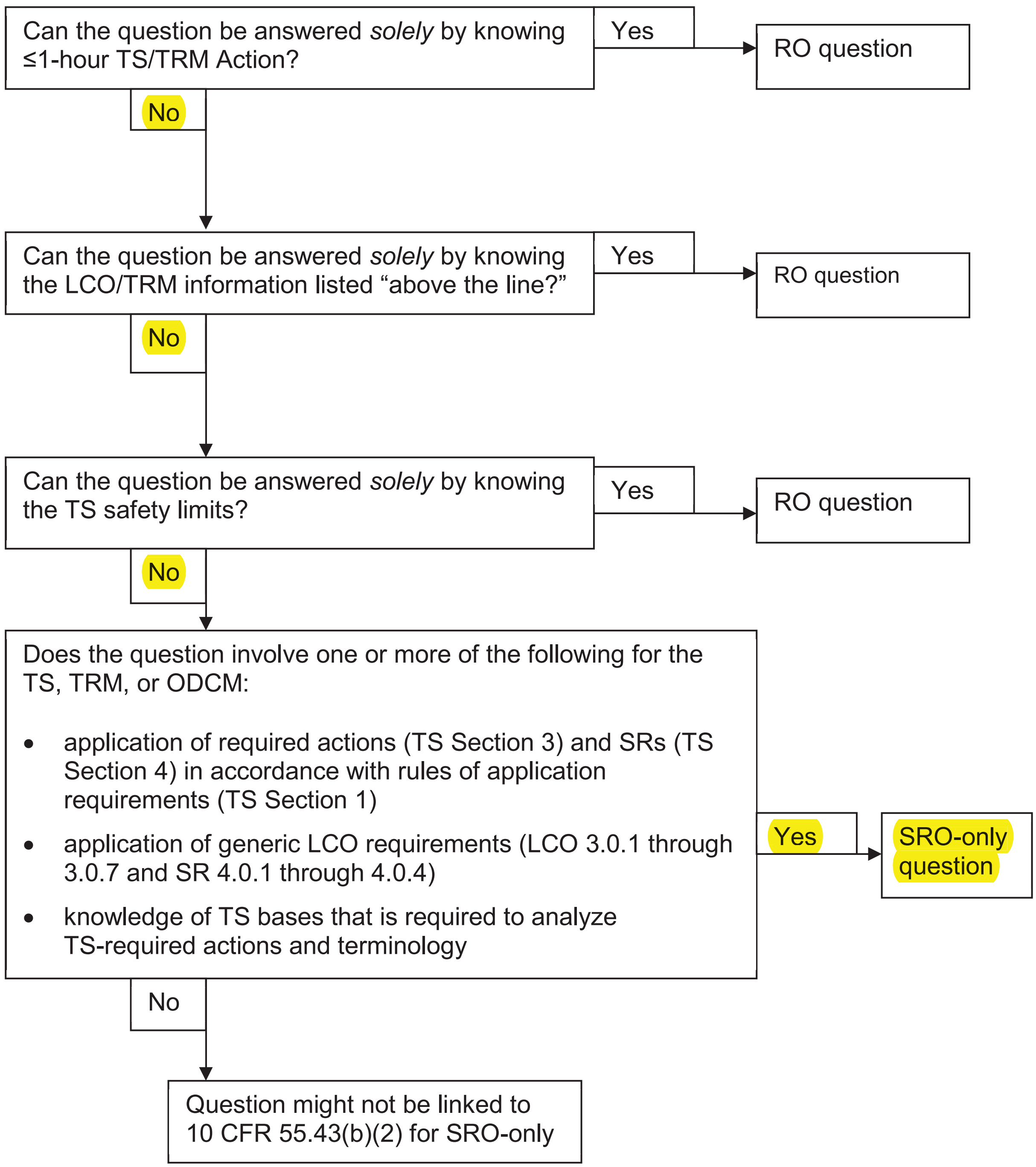
LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



88. 295021AA2.02 001/00701E11/H-OP-90000.011/MOD/P-AB/SRO/295021AA2.02/1/1/H/3/ARB/ABG

Unit 1 is in Mode 3 and the following conditions exist:

- o RHR Loop B aligned for Shutdown Cooling
- o RHR Loop 1B flow 7700 gpm
- o Reactor Coolant Temperature 274°F
- o RPV Pressure 30 psig
- o RWL +37 inches
- o Both Reactor Recirculation Pumps are secured

Subsequently, RHR pump 1B trips.

RHR pump 1D is started with a MAXIMUM RHR Loop B flow of 7000 gpm.

Based on the above conditions and IAW 34AB-E11-001-2, Loss Of Shutdown Cooling, which ONE of the choices below completes the following statement?

Reactor Coolant Temperature and RPV Pressure are REQUIRED to be monitored once every __________ by using __________ .

A. 60 minutes;
34GO-OPS-013-1, Normal Plant Shutdown, Attachment 1, Cooldown/Depressurization Check

B. 60 minutes;
34GO-OPS-015-1, Maintaining Cold Shutdown or Refuel Condition, Attachment 1, Monitoring Cold Shutdown And Refuel Parameters

C✓ 15 minutes:
34GO-OPS-013-1, Normal Plant Shutdown, Attachment 1, Cooldown/Depressurization Check

D. 15 minutes:
34GO-OPS-015-1, Maintaining Cold Shutdown or Refuel Condition, Attachment 1, Monitoring Cold Shutdown And Refuel Parameters

88. 295021AA2.02 001

Description:

IAW 34AB-E11-001-2, Loss Of Shutdown Cooling, step 4.7 below:

4.7 Increase monitoring of temperatures AND pressure per:
34GO-OPS-015-1, Attachment 1,OR
34GO-OPS-001-1, Attachment 8,OR
34GO-OPS-013-1, Attachment 1,
whichever is applicable, to at least **15 minute intervals**, including head AND flange temperatures using the following instruments:

4.7.1 Coolant temperatures:
Recirculation loop temperatures (1B31-R650) on panel 1H11-P602,
OR
RWCU Inlet temperature (1G31-R607), on panel 1H11-P602,
OR
RHR Heat Exchanger inlet temperatures (1E41-R605 Point 1 OR 2), on panel 1H11-P614.

4.7.2 Reactor vessel metal temperatures:
1B21-R606 on panel 1H11-P614,
OR
1B21-R607 on panel 1H11-P602.

4.7.3 Reactor vessel pressure will be determined using the process computer point B025 as the primary reading
OR
IF NOT available, a temporary pressure monitoring instrument will be installed per instructions contained within 34GO-OPS-015-1, Maintaining Cold Shutdown Or Refuel Condition.

TS 3.4.8, Condition B.2 Completion time with no RHR SDC or Recirc pump in operation is one hour.

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge in the body of an Abnormal procedure, plus remember TS Completion times and decide which time is required for monitoring reactor coolant temperatures.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant which procedure will be used for monitoring RPV temperature and pressure due to a loss of SDC (Flow of 7000 gpm) and the required frequency of monitoring these parameters.

The "A" distractor is plausible since the requirements in 34GO-OPS-015-1, Maintaining Cold

Shutdown Or Refuel Condition, is once per hour, if SDC was still in service. This is also the temperature requirement for TS 3.4.8, Condition B.2 Completion time with no RHR SDC subsystem or Recirc pump in operation. The second part is plausible since it is correct.

The "B" distractor is plausible since the requirements in 34GO-OPS-015-1, Maintaining Cold Shutdown Or Refuel Condition, is once per hour, if SDC was still in service. This is also the temperature requirement for TS 3.4.8, Condition B.2 Completion time with no RHR SDC subsystem or Recirc pump in operation. The second part is plausible since this is the procedure that 34GO-OPS-013-1 will direct to be used once RPV parameters have stabilized and entering Cold Shutdown.

"C" is correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible since this is the procedure that 34GO-OPS-013-1 will direct to be used once RPV parameters have stabilized and entering Cold Shutdown.

88. 295021AA2.02 001

References provided to the applicant:

NONE

K/A:

APE: 295021 Loss of Shutdown Cooling

AA2. Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : (CFR: 41.10 / 43.5 / 45.13)

AA2.02 RHR/shutdown cooling system flow 3.4 3.4

SRO only because of link to 10CFR55.43 (5): Assessment of facility conditions and selection of appropriate procedure, recalling the action in the body of procedure and when to take the action.

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-E11-RHR-00701, Residual Heat Removal System, **Ver. 11.1**,
LO H-OP-90000.011

Reference(s) used to develop this question:

34AB-E11-001-1, Loss of SDC, **Ver. 3.17**
34GO-OPS-013-1, Plant Shutdown, **Ver. 32.0**
34GO-OPS-015-1, Maintaining Cold Shutdown Or Refuel Condition, **Ver. 15.0**
TS 3.4.7 RHR SDC section for Hot Shutdown conditions, **Amendment 266**

Modified from HLT Database which was used on 2009 HLT-4 NRC Exam Q#87

ORIGINAL QUESTION

Unit 1 is in Mode 3 and the following conditions exist:

- o "1B" Residual Heat Removal (RHR) aligned for Shutdown Cooling (SDC)
- o "1B" RHR loop flow .... 7,700 gpm
- o Reactor Coolant temperature .... 274°F
- o Reactor Pressure .... 30 psig
- o Reactor Water Level .... +37 inches
- o Both Reactor Recirculation Pumps are secured

The "1B" RHR pump trips and neither RHR loop can be aligned for SDC.

Which ONE of the following answers both of these statements?

Reactor water level ___(1)___ adequate to ensure there is a flow path available for reactor coolant natural circulation.

The operator is required to increase monitoring of temperature and pressure IAW 34AB-E11-001-1, "Loss of Shutdown Cooling," by using ___(2)___ .

A. (1) is
(2) 34GO-OPS-013-1, "Normal Plant Shutdown," Attachment 1, "Cooldown/Depressurization Check"

B.✓ (1) is NOT
(2) 34GO-OPS-013-1, "Normal Plant Shutdown," Attachment 1, "Cooldown/Depressurization Check"

C. (1) is
(2) 34GO-OPS-015-1, "Maintaining Cold Shutdown or Refuel Condition," Attachment 1, "Monitoring Cold Shutdown And Refuel Parameters"

D. (1) is NOT
(2) 34GO-OPS-015-1, "Maintaining Cold Shutdown or Refuel Condition," Attachment 1, "Monitoring Cold Shutdown And Refuel Parameters"

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

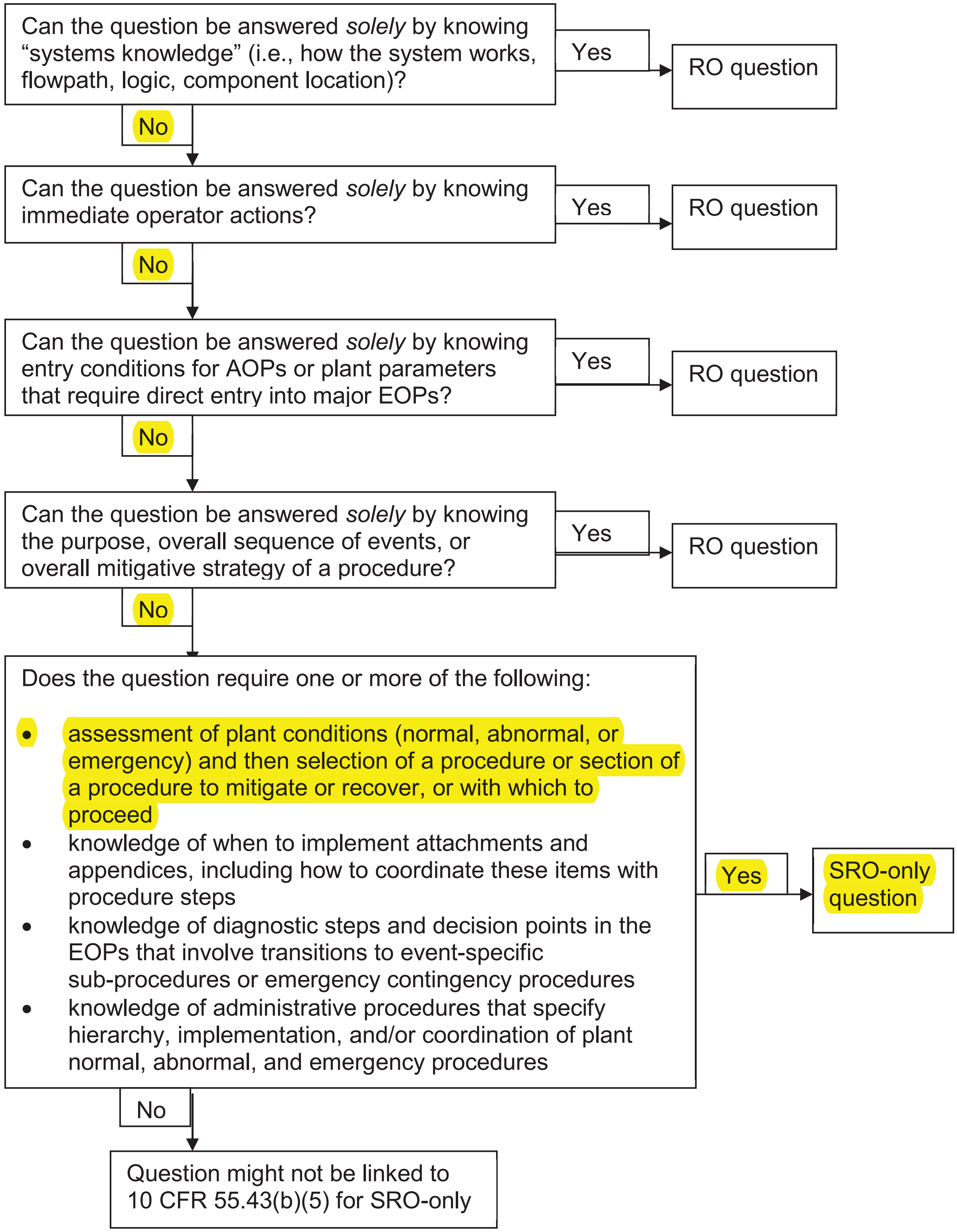
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)



89. 295025G2.2.37 001/00501E41/H-OP-90000.007/MOD/P-EOP/SRO/295025G2.2.37/1/1/H/3/ARB/ABG

Unit 2 was operating at 100% RTP when a reactor scram occurred.

31EO-EOP-107-2, Alternate RPV Pressure Control, is in progress with the RCIC System aligned & operating in Pressure Control Mode IAW Section 3.4:

- o RPV pressure is 1000 psig and slowly rising
- o 2E51-R612, RCIC flow controller setpoint is 200 gpm in AUTOMATIC

Based on the above conditions,

IAW TS 3.5.3 RCIC System, RCIC is considered __________ .

IAW 31EO-EOP-107-2, to stabilize RPV pressure, the operator will THROTTLE 2E51-F022, Test Line to CST Valve, in the __________ direction.

A.✔ INOPERABLE;
CLOSED

B. INOPERABLE;
OPEN

C. OPERABLE;
CLOSED

D. OPERABLE;
OPEN

89. 295025G2.2.37 001

Description:

With RPV pressure rising and RCIC aligned for pressure control, raising the 2E51-R612, RCIC flow controller, setpoint will lower RPV pressure (new flow setpoint will increase the steam demand to the RCIC turbine to achieve the new flow demand by the controller). Throttling 2E51-F022, Test Line to CST Valve, will also control reactor pressure (throttling closed requires the turbine to draw more steam to achieve the controller flow demand).

SR 3.5.3.2 Bases:
Verifying the correct alignment for manual, power operated, and automatic valves in the RCIC flow path provides assurance that the proper flow path will exist for RCIC operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these valves were verified to be in the correct position prior to locking, sealing, or securing. **A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time.** This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. **For the RCIC System, this SR also includes the steam flow path for the turbine and the flow controller position.**

TS Bases 3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control:
One LPCI subsystem may be aligned for decay heat removal and **considered OPERABLE** for the ECCS function, **if it can be manually realigned** (remote or local) **to the LPCI mode** and is not otherwise inoperable. Because of the restrictions on DRAIN TIME, sufficient time will be available following an unexpected draining event to manually align and initiate LPCI subsystem operation to maintain RPV water inventory prior to the RPV water level reaching the TAF.

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of EOP Supplemental procedures and Tech Specs for RCIC alignment in order to determine if RCIC is operable or inoperable when operating in a mode (controller in manual) other than the TS required mode.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the operability of RCIC based upon operating in a mode (controller in manual) other than an ECCS mode such as to mitigate a high RPV pressure condition.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since it would be correct if attempting to raise RPV pressure.

The "C" distractor is plausible since there are other TS systems (LPCI in Shutdown Cooling) that is allowed to have manual actions performed to return the system to the required TS function and still be considered operable. The second part is plausible since it is correct.

The "D" distractor is plausible since there are other TS systems (LPCI in Shutdown Cooling) that is allowed to have manual actions performed to return the system to the required TS function and still be considered operable. The second part is plausible since it would be correct if attempting to raise RPV pressure.

89. 295025G2.2.37 001

References provided to the applicant:

NONE

<u>K/A:</u>

EPE: 295025 High Reactor Pressure

G2.2.37 Ability to determine operability and/or availability of safety related equipment.
(CFR: 41.7 / 43.5 / 45.12) 3.6 4.6

SRO only because of link to 10CFR55.43(b)(2): Facility operating limitations in the technical specifications and their bases.

<u>LESSON PLAN/OBJECTIVE:</u>

H-LT-NL-LP-E41-HPCI-00501, High Pressure Coolant Injection (HPCI), **Ver. 8.2**,
LO H-OP-90000.007
H-LT-PP-EOP-107-LP-20318, EOP 107: Alternate Pressure Control, **Ver.** 1.1,
LO 7 (005.015.A.05)

<u>Reference(s) used to develop this question:</u>

31EO-EOP-107-2, Alternate RPV Pressure Control, **Ver. 5.3**
Unit 2 TS 3.5.3 RCIC System, **Amendment 235**
Unit 2 TS Bases 3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control, **Revision 110**
Unit 2 TS Bases 3.5.3 RCIC System, **Revision 110**
Modified from HLT Database which was used on 2016 HLT-10 NRC Exam Q#52

ORIGINAL QUESTION

31EO-EOP-107-2, Altenate RPV Pressure Control, is in progress.

- o RPV pressure 1060 psig and slowly rising
- o HPCI system is aligned in Pressure Control Mode
- o 2E41-R612, HPCI flow controller is in AUTOMATIC with the setpoint at 2500 gpm

Based on the above conditions and IAW 31EO-EOP-107-2,

To stabilize RPV pressure, the operator will __________ .

A.✓ RAISE the setpoint on 2E41-R612, HPCI flow controller

B. LOWER the setpoint on 2E41-R612, HPCI flow controller

C. throttle 2E41-F011, Test to CST VLV, in the CLOSE direction

D. throttle 2E41-F011, Test to CST VLV, in the OPEN direction

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

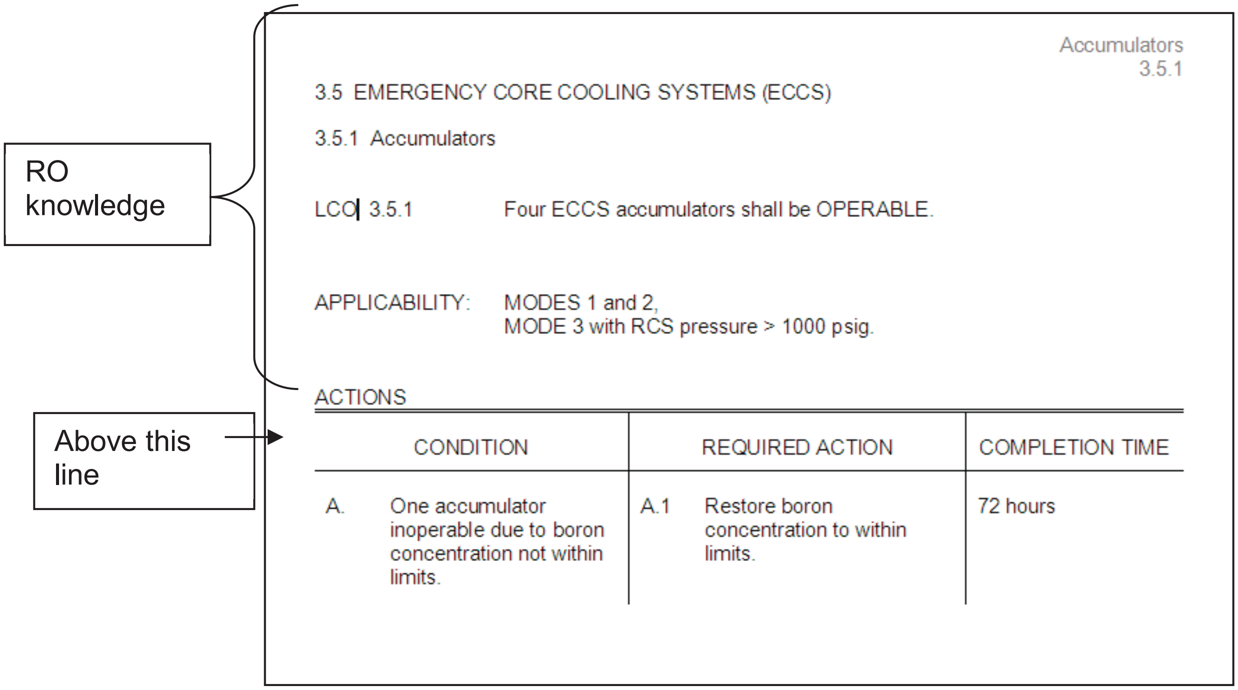
B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge.   ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).



Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

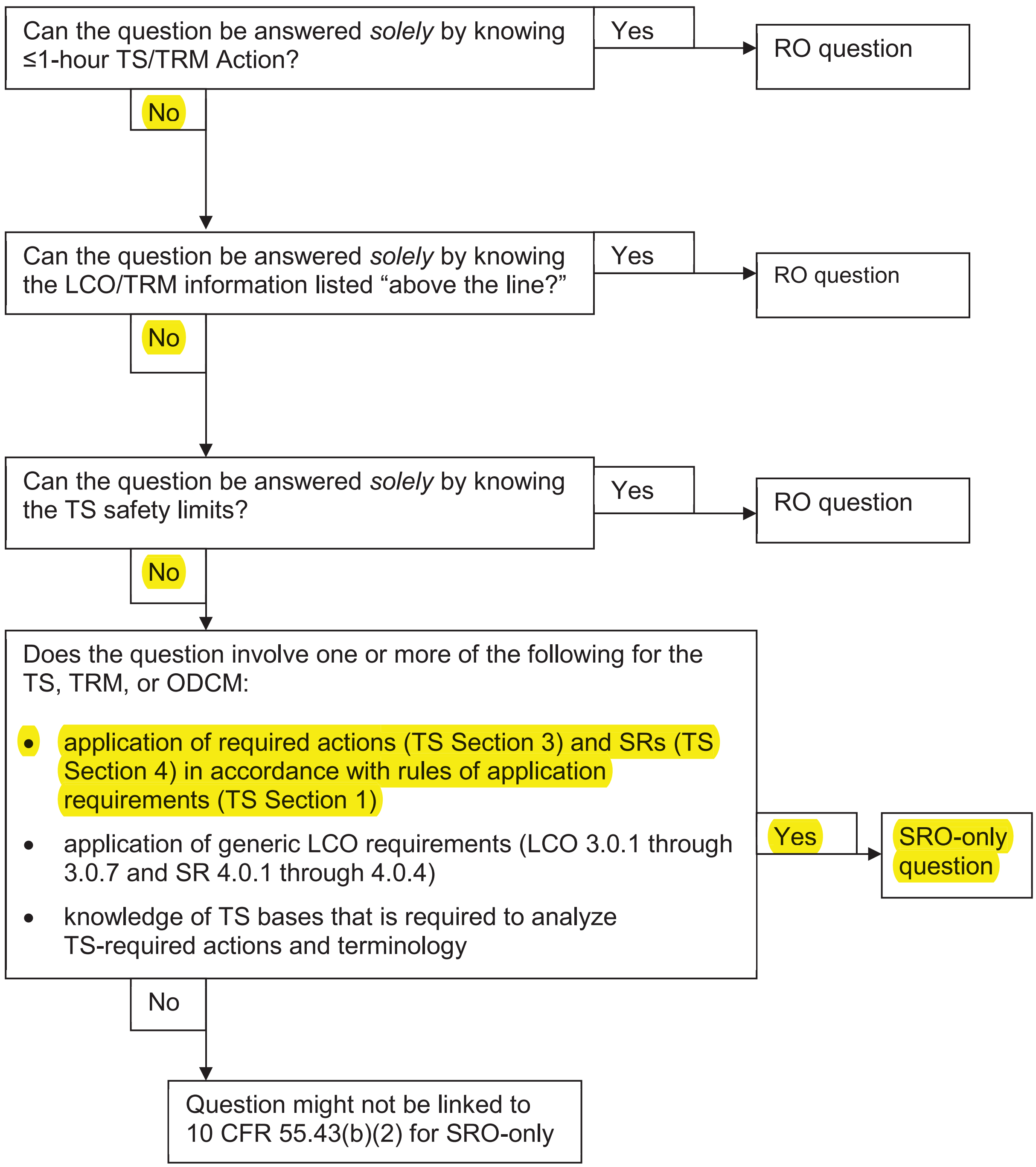
LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



90. 295031G2.2.44 001/20308RC/201.065.A.20/MOD/P-EOP/SRO/295031G2.2.44/1/1/H/3/ARB/ABG

Unit 2 was operating at 100% RTP when a transient occurred causing the following indications:

o 2B21-R623A, Fuel Zone,	-110 inches, lowering 1 inch/minute
o 2B21-R623B, Fuel Zone,	-113 inches, lowering 1 inch/minute
o RHR Pump 2D	Green light ILLUMINATED White light ILLUMINATED Red light EXTINGUISHED
o Only CRD Pump 2A	Injecting

ALL other Table L-6 injection systems are UNAVAILABLE.

Based on the above conditions, which ONE of the choices below completes both statements?

RHR pump 2D __________ ALLOWED to be restarted.

Transition to CP-1, C1/L path __________ REQUIRED.

A✓ is;
is NOT

B. is;
is

C. is NOT;
is NOT

D. is NOT;
is

90. 295031G2.2.44 001

Description:

Bruno, this was a Pre-submittal SRO question. Changes were incorporated based on your ES-401-9 comments.

IAW H-LT-NL-LP-E11-RHR-00701, Residual Heat Removal System, When an RHR pump is secured by the operator with its control switch activates the LOCA override circuit for that pump (removes LOCA signal applied to start circuit for that pump) which causes the white Override light above the pump control switch to illuminate.

Each injection subsystem is a motor-driven system loop independently capable of supplying high quality makeup water to the RPV. The injection subsystems are listed in Table L-6. They are a subset of the Preferred Injection systems (Table L-1), which include both those used to control RWL during normal plant operations at power and those categorized as emergency makeup.

If the flow provided by Preferred Injection subsystems will not provide ACC, steam-driven systems and low-capacity motor-driven systems such as CRD, SBLC and Alternate injection subsystems must be relied upon until additional systems become available.

Submergence is the preferred method for cooling the core. Adequate spray cooling is provided Hatch BWR 4 design, assuming a bounding axial power shape, when design spray flow requirements are satisfied and RWL is at or above the elevation of the jet pump suctions. Steam cooling with makeup capability exists if RWL is above the MSCRWL (minimum steam cooling RWL). Irrespective of the existing RPV pressure and current injection flowrate, if it is determined that one or more injection subsystems can assure ACC by any of these methods, the subsystems are considered available and transfer to Contingency #1 (Alternate level control) is not required. Guidance in the RPV pressure control section of the guidelines is given to control RPV pressure as necessary so that available injection subsystems will restore and maintain ACC.

If RPV pressure is reduced prematurely before a motor-driven RPV injection source is available, steam-driven systems could be lost and ACC threatened. If low capacity motor-driven systems are the only source of injection, RPV pressure must be lowered to below the maximum RPV injection pressure for these sources if ACC is to be maintained. If no source of RPV injection is available, RPV inventory must be conserved to prolong core cooling conditions while an injection source is returned to service. Entry to Contingency #1 (Alternate Level Control) optimizes the RWL and pressure control strategies for these conditions.

SRO JUSTIFICATION:

The SRO must have detailed knowledge of the RC flow chart Overrides to determine if transitioning to CP-1 C1/L path is needed based upon the available injection systems and the low RWL condition. EOP decision point overrides are above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to interpret RHR pump 2D light status (control room indications) and determine this pump is required to be started (operator actions and directives) due to the low RWL condition.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible if the applicant believes since only one Preferred Table L-1 Injection System is injecting (CRD) that RWL will not be maintained and uses the override for "If it is anticipated (Table 6) alone cannot restore and maintain ACC" and transitions to CP-1, C1/L path.

The "C" distractor is plausible since other pumps will indicate when it has tripped by illuminating a "middle light" above the control switch, therefore since it has a tripped light illuminated it is not allowable to be restarted until an investigation is complete. The second part is plausible since with less than 2 Table L-6 systems operating, all available L-2 systems will be aligned for operation awaiting the emergency depress from the RC/L path.

The "D" distractor is plausible since other pumps will indicate when it has tripped by illuminating a "middle light" above the control switch, therefore since it has a tripped light illuminated it is not allowable to be restarted until an investigation is complete. The second part is plausible if the applicant believes since only one Preferred Table L-1 Injection System is injecting (CRD) that RWL will not be maintained and uses the override for "If it is anticipated (Table 6) alone cannot restore and maintain ACC" and transitions to CP-1, C1/L path.

90. 295031G2.2.44 001

References provided to the applicant:

NONE

K/A:

EPE: 295031 Reactor Low Water Level

G2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (CFR: 41.5 / 43.5 / 45.12) 4.2 4.4

SRO only because of link to 10CFR55.43 (5): Assessment of facility conditions and selection of appropriate procedure, recalling the action in the body of procedure and when to take the action.

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-E11-RHR-00701, Residual Heat Removal System, **Ver. 11.1**,
LO H-OP-90000.014
H-LT-LP-EOP-RC-20308, RPV Control (Non-ATWS), EO 201.083.A.02, **Ver. 4.0**,
LO 201.065.A.20

Reference(s) used to develop this question:

E11-RHR-LP-00701, Residual Heat Removal System, **Ver. 42.11**
31EO-EOP-010-2, RC, (Non-ATWS), **Ver. 11.0**
31EO-EOP-015-2, CP-1, **Ver. 11.0**
Modified from HLT Database which was used on 2009 HLT-5 NRC Exam Q#91

ORIGINAL QUESTION

Unit 2 was operating at 100% power when a transient occurred causing the following indications:

- o 2B21-R623A "Fuel Zone" .... -160 inches, decreasing 2"/minute
- o 2B21-R623B "Fuel Zone" .... -163 inches, decreasing 2"/minute
- o RHR Pump "2D" .... Green and White lights are illuminated, Red light extinquished

Which ONE of the following completes both of these statements?

RHR pump "2D" has __________ ;

Reactor water level control will be directed from __________ .

A. been manually secured;
31EO-EOP-010-2, "RC" (Non-ATWS) flow chart, RC/L path

B.✓ been manually secured;
31EO-EOP-015-2, "CP-1" flow chart, Alternate Level Control path

C. automatically tripped;
31EO-EOP-010-2, "RC" (Non-ATWS) flow chart, RC/L path

D. automatically tripped;
31EO-EOP-015-2, "CP-1" flow chart, Alternate Level Control path

C. <u>Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility</u> [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. <u>Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions</u> [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. <u>Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations</u> [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant’s knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure’s content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using “systems knowledge,” such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

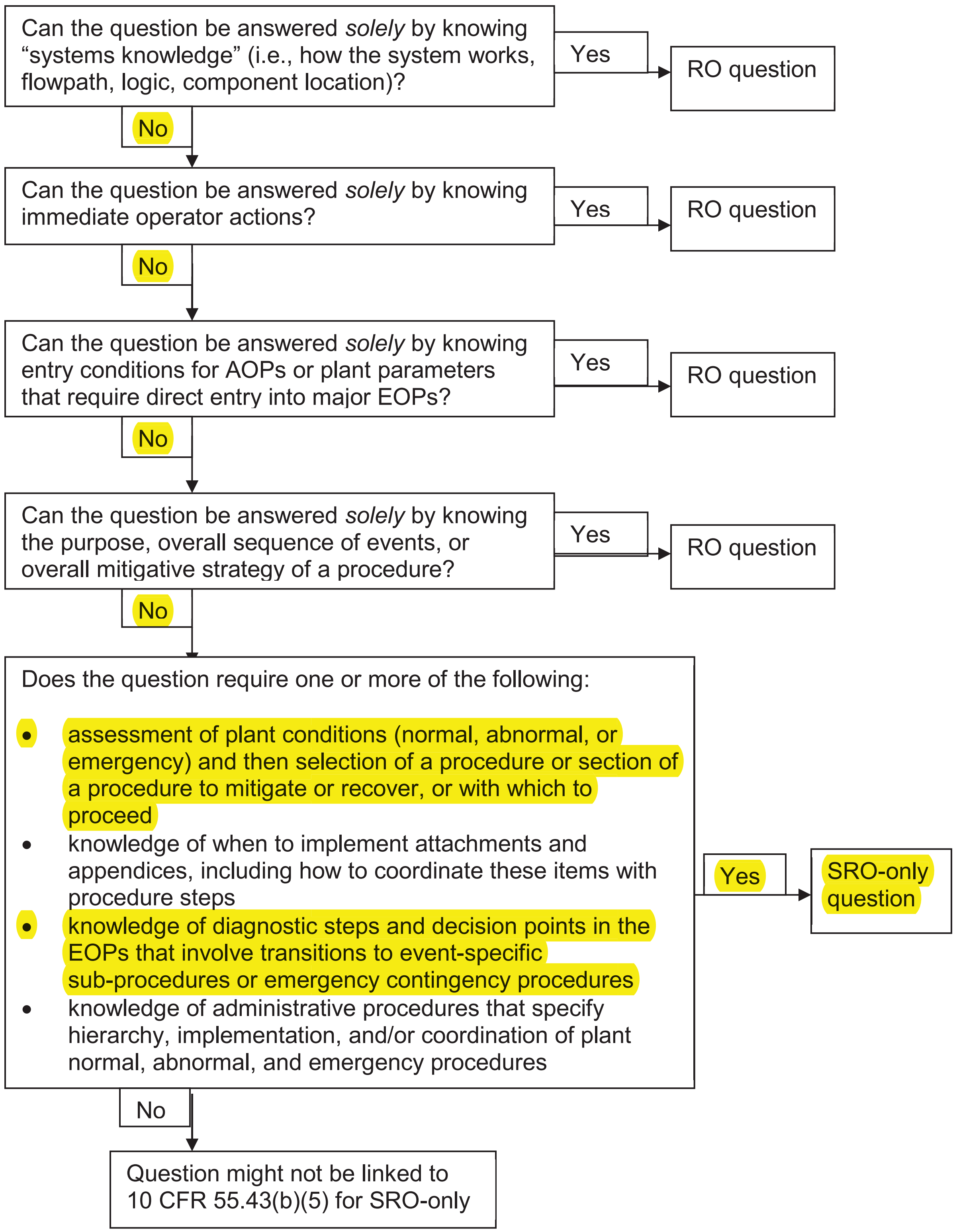
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)



91. 295033G2.4.31 001/20325SCRR/201.079.A.05/MOD/P-EOP/SRO/295033G2.4.31/1/2/H/3/ARB/ABG

Unit 2 is operating at 50% RTP due to a fuel leaker and HPCI Danger Tagged out of service.

An event causes a Group 1 Isolation and results in the following:

- o RWL is -130 inches and slowly rising using RCIC
- o All Low Pressure ECCS systems are UNAVAILABLE
- o LEAK DET AMBIENT TEMP HIGH, 601-327, is ALARMING
- o RCIC ISOL TIMER INITIATED, 602-303, is ALARMING
- o Secondary Containment ISOLATED due to Reactor Building High Radiation
- o Offsite dose rate at the Site Boundary is 0.7 mr/hr TEDE

Based on the above conditions,

The RCIC System __________ .

IAW 31EO-EOP-014-2, Secondary Containment Control/Radioactivity Release Control, the Reactor Building Ventilation __________ ALLOWED to be restarted.

A. high temp isolation will be bypassed IAW 31EO-EOP-100-2, Miscellaneous Overrides; is

B✓ high temp isolation will be bypassed IAW 31EO-EOP-100-2, Miscellaneous Overrides; is NOT

C. will be isolated IAW 34AB-T22-003-2, Secondary Containment Control; is

D. will be isolated IAW 34AB-T22-003-2, Secondary Containment Control; is NOT

91. 295033G2.4.31 001

Description:

IAW 34AR-602-303-2, RCIC ISOL TIMER INITIATED,

5.1.3 Monitor 2E51-R602 for decreasing RCIC Turb Inlet Press.

5.1.4 Monitor for increasing area radiation levels, panel 2H11-P600.

5.1.5 IF a steam leak **does exist**, enter 34AB-T22-001-2, Primary Coolant System Pipe Break Reactor Building.

IAW 34AR-601-327, LEAK DET AMBIENT TEMP HIGH,

5.2 IF ambient temperature is above the alarm setpoint, enter 34AB-T22-003-2, Secondary Containment Control.

IAW 34AB-T22-003,

4.2 IF at any time while performing this procedure, any of the following Secondary Containment parameters exceeds its Maximum Normal Operating value in any area, **enter 31EO EOP 014 2**, SC/RR Secondary Containment/Radioactivity Release Control:

- o area ambient temperature (Attachment 2, 3, or 9)
- o area differential temperature (Attachment 2, 3, or 9)
- o differential pressure (Attachment 5)
- o area radiation (Attachment 6 or 10)
- o HVAC exhaust radiation (Attachment 6 or 10)
- o area water level (Attachment 8)

IAW the override on the RC EOP flowchart, RCIC isolation timer is allowed to be overriden.

IAW the override on SC/RR EOP flowchart, the Reactor Building HVAC systems cannot be restarted since a high radiation condition exists in the Reactor Building (isolated on high exhaust radiation).

SRO JUSTIFICATION:

The SRO must have detailed knowledge of the ARP (RCIC leak), Abnormal for SC and 31EO-EOP-014-2, Secondary Containment Control, utilizing two decision points on the SC/RR flowchart (EOP Overrides) to determine if RCIC is allowed to continue operation and to determine if the restart of ventilation systems based on plant conditions is allowed. Both are above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the required RCIC status based knowledge of the ARP, AB and then the subsequent EOP decision points for allowing RCIC operation and for restarting Reactor Building ventilation during a Secondary Containment radiation event.

The "A" distractor is plausible since the first part is correct. The second part is plausible since the Reactor Building HVAC System can be restarted if the condition which caused the isolation was either high DW pressue or low RWL.

"B" is Correct.

The "C" distractor is plausible since it would be correct if the HPCI system was available, then the ARP, AB & EOP flowchart would direct RCIC to be isolated IAW 34AB-D11-001-2. The second part is plausible since the Reactor Building HVAC System can be restarted if the condition which caused the isolation was either high DW pressue or low RWL.

The "D" distractor is plausible since it would be correct if the HPCI system was available, then the ARP, AB & EOP flowchart would direct RCIC to be isolated IAW 34AB-D11-001-2. The second part is plausible since it is correct.

91. 295033G2.4.31 001

References provided to the applicant:

NONE

K/A:

EPE: 295033 High Secondary Containment Area Radiation Levels

G2.4.31 Knowledge of annunciator alarms, indications, or response procedures.
(CFR: 41.10 / 45.3) 4.2 4.1

SRO only because of link to 10CFR55.43 (b)(5): Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations; Knowledge of diagnostic steps and decision points n the emergency operating proedures (EOP) that involve transitions to event specific sub-procedures or emergency contingency procedures.

LESSON PLAN/OBJECTIVE:

H-LT-LP-EOP-20325-SCRR, Secondary Containment, Radioactivity Release Control, **Ver 4.0**, EO 201.079.A.05, 201.081.A.01, 201.081.B.01

Reference(s) used to develop this question:

31EO-EOP-100-2, Miscellaneous Overrides, **Ver. 8.3**
34AB-D11-001-2, Radioactivity Release Control, **Ver. 1.9**
34AB-T22-003-2, Secondary Containment Control, **Ver. 4.3**
34AR-602-303-2, RCIC ISOL TIMER INITIATED, **Ver. 4.2**
31EO-EOP-014-2, SC - Secondary Containment Control / RR - Radioactivity Release Control, **Ver. 12.0**

Modified from HLT Database which was used on Hatch 2015 ILT-9 NRC Exam Q#92

ORIGINAL QUESTION

Unit 2 is operating at 50% RTP due to a fuel leaker.

A Seismic Event causes a Group 1 Isolation and results in the following:

- o RWL is -135 inches and slowly increasing with HPCI
- o All Low Pressure ECCS systems are UNAVAILABLE
- o LEAK DET AMBIENT TEMP HIGH (601-327) is alarming

- o RCIC ISOL TIMER INITIATED, (602-303) is alarming
- o Radiation levels in the Reactor Building cause Secondary Containment to ISOLATE
- o Offsite dose rate at the Site Boundary is 0.7 mr/hr TEDE

Based on the above conditions,

The RCIC System will be isolated IAW __________ .

IAW 31EO-EOP-014-2, Secondary Containment Control/Radioactivity Release Control, the Reactor Building Ventilation __________ ALLOWED to be restarted.

A. 34AB-D11-001-2, Radioactivity Release Control;
is

B.✓ 34AB-D11-001-2, Radioactivity Release Control;
is NOT

C. 31EO-EOP-100-2, Miscellaneous Overrides;
is

D. 31EO-EOP-100-2, Miscellaneous Overrides;
is NOT

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, "Changes, Tests and Experiments"
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)

Can the question be answered *solely* by knowing "systems knowledge" (i.e., how the system works, flowpath, logic, component location)?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry into major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following:

- assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed
- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event-specific sub-procedures or emergency contingency procedures
- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

92. 295038EA2.02 001/03101N62/H-OP-90000.005/MOD/TECH SPEC/SRO/295038EA2.02/1/1/H/3/ARB/ABG

Unit 2 has been operating at 100% RTP for the last 100 days.

At 12:00, Chemistry reports the gross gamma activity rate for noble gases measured at the Offgas Pretreatment monitor station has risen from 50 mCi/second to 120 mCi/second.

Based on the above conditions and IAW TS/Bases 3.7.6, Main Condenser Offgas,

The LATEST listed time that SR 3.7.6.1 can be completed WITHOUT entering a Required Action Statement (RAS) is __________ .

The limit for TS 3.7.6 is based on __________ .

Reference Provided

A. 15:30:
the filtering capacity of the offgas charcoal beds

B.✓ 15:30:
a significant break in the offgas piping

C. 16:30:
the filtering capacity of the offgas charcoal beds

D. 16:30:
a significant break in the offgas piping

92. 295038EA2.02 001

Description:

EXAMPLE 1.4-2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours after ≥ 25% RTP AND 24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time reactor power is increased from a power level < 25% RTP to ≥ 25% RTP, the Surveillance must be performed within 12 hours.

The use of **"once"** indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). **This type of Frequency does not qualify for the extension allowed by SR 3.0.2**.

SR 3.0.2 - The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. **For Frequencies specified as "once," the above interval extension does not apply.** If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance. Exceptions to this Specification are stated in the individual Specifications.

SR 3.7.6.1 - This SR requires an isotopic analysis of an offgas sample to ensure that the required limits are satisfied. The noble gases to be sampled are Xe-133, Xe-135, Xe-138, Kr-85m, Kr-87, and Kr-88. If the measured rate of radioactivity increases significantly (by > 50% after correcting for expected increases due to changes in THERMAL POWER), an isotopic analysis is also performed **within 4 hours** after the increase is noted, to ensure that the increase is not indicative of a sustained increase in the radioactivity rate.

IAW TS Bases 3.7.6:

The main condenser offgas gross gamma activity rate is an initial condition of the Main Condenser Offgas System failure event, discussed in the FSAR, Section 9.4 and Appendix E (Ref. 1). The analysis assumes a gross failure in the Main Condenser Offgas System **that results in the rupture of the Main Condenser Offgas System pressure boundary**. The gross gamma activity rate is controlled to ensure that, during the event, the calculated offsite doses will be well within the limits of 10 CFR 100.

SRO JUSTIFICATION:

The SRO is required to have detatiled knowledge of TS Frequency and Completion Times and TS Bases knowledge to answer this question. Both are above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to determine the TS completion time after the total number of curies being released doubles from its previous value and the TS Bases for the TS addressing the curies released.

The "A" distractor is plausible since the first part is correct. The second part is plausible because the offgas charcoal beds do filter/adsorb the offgas process but are downstream of where the gross gamma activity is measured (pre-treatment rad monitors).

"B" is Correct.

The "C" distractor is plausible since this would be the latest time if SR 3.0.2 is applied to the 4 hours completion time. The second part is plausible because the offgas charcoal beds do filter/adsorb the offgas process but are downstream of where the gross gamma activity is measured (pre-treatment rad monitors).

The "D" distractor is plausible since this would be the latest time if SR 3.0.2 is applied to the 4 hours completion time. The second part is plausible since it is correct.

92. 295038EA2.02 001

References provided to the applicant:

Unit 2 TS 3.7.6 Main Condenser Offgas, with surveillance

K/A:

EPE: 295038 High Off-Site Release Rate

EA2. Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : (CFR: 41.10 / 43.5 / 45.13)

EA2.02 †Total number of curies released 2.5* 3.3*

SRO only because of link to 10CFR55.43(b)(2): Facility operating limitations in the technical specifications and their bases.

LESSON PLAN/OBJECTIVE:

N62-OG-LP-03101, Offgas System, **Ver. 7.0,** LO H-OP-90000.005

Reference(s) used to develop this question:

Unit 2 TS 3.7.6, Main Condenser Offgas, **Amendment 225**
Unit 2 Bases 3.7.6, Main Condenser Offgas, **Revision 98**

Modified from HLT Database which was used on 2017 Hatch NRC Exam Q#92

ORIGINAL QUESTION

Unit 1 is operating at 100% RTP.

Chemistry reports the following gross gamma activity rate for noble gases measured at the Offgas Pretreatment monitor station:

- o 290 mCi/second

Based on the above conditions and IAW TS and Bases 3.7.6, Main Condenser Offgas,

Entry into a Required Action Statement (RAS) __________ REQUIRED for TS 3.7.6, Main Condenser Offgas.

The limit for TS 3.7.6 is based on __________ .

A.✓ is;
a significant break in the offgas piping

B. is;
the filtering capacity of the offgas charcoal beds

C. is NOT;
a significant break in the offgas piping

D. is NOT;
the filtering capacity of the offgas charcoal beds

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).

RO knowledge

Above this line

Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

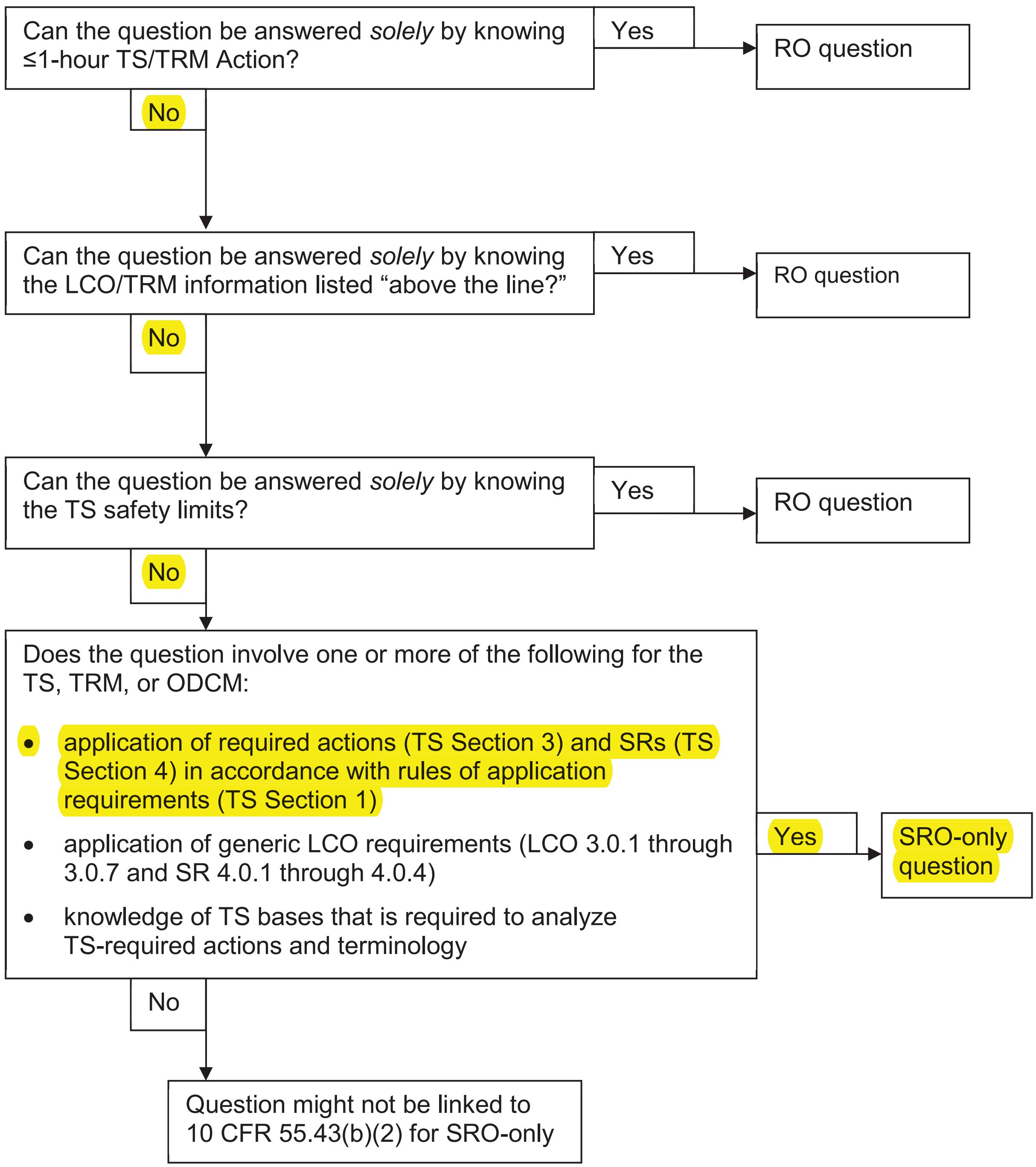
LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



93. 400000A2.03 001/00901P42/90000.004/BANK/TECH SPECS/SRO/400000A2.03/2/1/H/3/ARB/ABG

Unit 2 is at 30% RTP during a startup after an extended outage when the following alarm is received:

RBCCW HX OUTLET TEMP HIGH (650-249)

The control room operator observes the RBCCW pump suction temperature is 101°F and dispatches the system operator to increase service water flow through the heat exchanger.

Based on the above conditions, which ONE of the choices below completes both statements?

The result of locally throttling open the Service Water valve would be a __________ .

The PSW Effluent Monitor must be operable __________ .

A. reduced PSW to RBCCW differential pressure

ONLY in Modes 1 and 2

B✓ reduced PSW to RBCCW differential pressure

ONLY if ODCM differential pressure requirements are not met

C. raised PSW to RBCCW differential pressure

ONLY in Modes 1 and 2

D. raised PSW to RBCCW differential pressure

ONLY if ODCM differential pressure requirements are not met

93. 400000A2.03 001

Description:

RBCCW HX OUTLET TEMP HIGH, P650-249
Step 5.2, Directs to throttle open 2P41-F440A/B RBCCW HX PSW discharge valve in an effort to restore CCW temperature.

The differential pressure between the PSW and RBCCW system is maintained greater than 7 PSID. An alarm is actuated when the dp decreases below this setpoint. Low dp is confirmed locally by comparing the PSW Out Pressure indicator with the RBCCW Hx Inlet Press indicator on the heat exchangers in service.

ODCM Table 2-1, Radioactive Liquid Effluent Monitoring Instrumentation

Table 2-1 Radioactive Liquid Effluent Monitoring Instrumentation

Instrument	OPERABILITY Requirementsa		
	Minimum Channels OPERABLE	Applicability[b]	ACTION
1. Gross Radioactivity Monitors Providing Automatic Termination of Release			
Liquid Radwaste Effluent Line	1	(1)	100
2. Gross Radioactivity Monitors not Providing Automatic Termination of Release			
Service Water System Effluent Line	1	**(2)**	101

a. All requirements in this Table apply to each unit.

b. Applicability of requirements is as follows:
   (1) Whenever the radwaste discharge valves are not locked closed.
   (2) Whenever the Service Water System pressure is below the Closed Cooling Water System pressure, or ΔP indication is not available.

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of the ODCM to determine the Service Water System Effluent Line will be required to be operable, based upon a footnote in the ODCM. This type of knowledge is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by the applicant predicting what happens if RBCCW temperature continues to rise and then which procedure (ODCM) will migate.

The "A" distractor is plausible since the first part is correct. The second part is plausible since Modes 1 and 2 are the typical Modes for many LCO applicabilities.

"B" is Correct.

The "C" distractor is plausible if the RBCCW pressure is the higher pressure (some systems it is) and then opening the inlet to the Hx would result in a higher dP. The second part is plausible since Modes 1 and 2 are the typical Modes for many LCO applicabilities.

The "D" distractor is plausible if the RBCCW pressure is the higher pressure (some systems it is) and then opening the inlet to the Hx would result in a higher dP. The second part is plausible since it is correct.

93. 400000A2.03 001

References provided to the applicant:

NONE

K/A:

400000 Component Cooling Water System (CCWS)

A2. Ability to (a) predict the impacts of the following on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6)

A2.03 High/low CCW temperature 2.9 3.0

SRO only because this question is tied to 10CFR55.43 (2): Facility operating limitations in the technical specifications and their bases. Also tied to 10CFR55.43 (5): Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

LESSON PLAN/OBJECTIVE:

P42-RBCCW-LP-00901, Reactor Building Closed Cooling Water, **Ver 5.0**,
LO 90000.007 & LO 90000.013

Reference(s) used to develop this question:

34AR-650-249-2, RBCCW HX OUTLET TEMP HIGH, **Ver. 4.1**
34AR-650-238-2, Hx PSW/RBCCW Diff Press Low, **Ver. 4.0**
34SO-P42-001-1, Section 7.3.8, Adjusting RBCCW/PSW Differential pressure, **Ver. 18.0**
HNP ODCM, Section 2.1.1, Liquid Effluent Monitoring Instrumentation Control, **Ver. 25.0**

Bank question from HLT Database which was used on 2007 HLT-3 NRC Exam Q#92

II. Examples of Additional Knowledge and Abilities as They Pertain to an SRO License and the 10 CFR 55.43(b) Topics [ES-401, Section D.1.c]

A. Conditions and Limitations in the Facility License [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include the following:

- reporting requirements when the maximum licensed thermal power output is exceeded
- administration of fire protection program requirements, such as compensatory actions associated with inoperable sprinkler systems and fire doors
- required actions necessary when a facility does not meet the administrative controls listed in Technical Specifications (TS), Section 5 or 6, depending on the facility (e.g., shift staffing requirements)
- National Pollutant Discharge Elimination System requirements, if applicable
- processes for TS and final safety analysis report changes

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

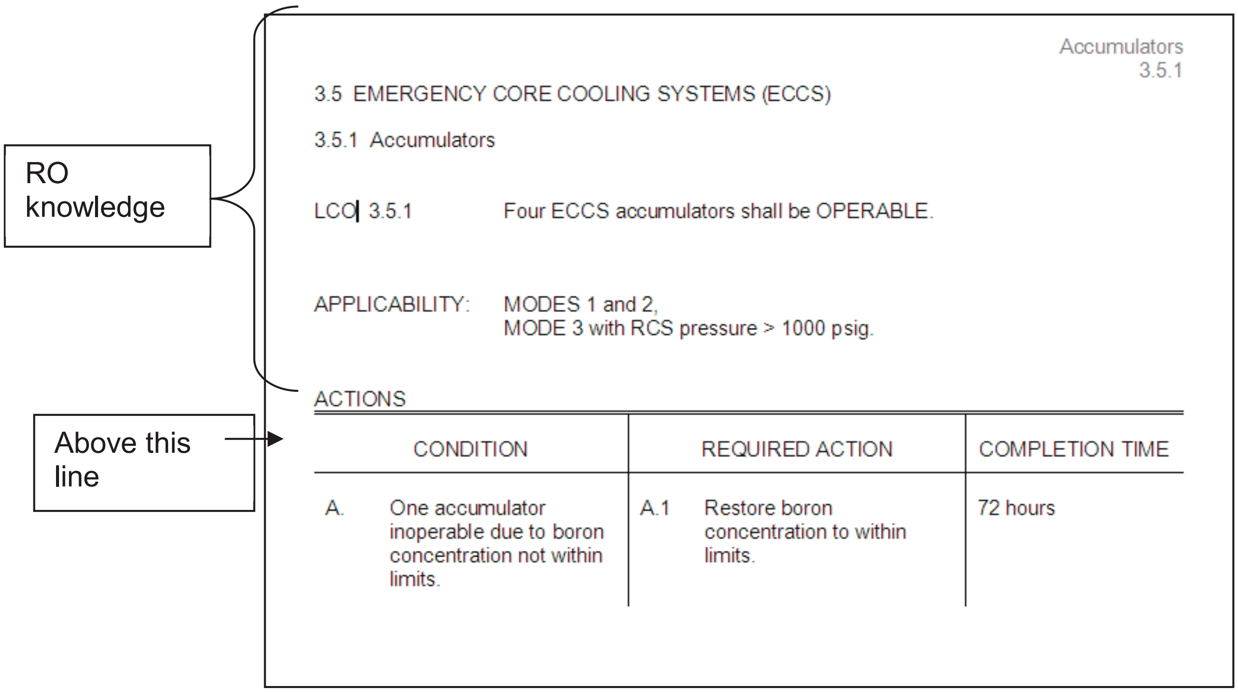
B. Facility Operating Limitations in the Technical Specifications and Their Bases [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic the following:

- application of required actions (TS Section 3) and surveillance requirements (SR) (TS Section 4) in accordance with rules of application requirements (TS, Section 1)
- application of generic limiting condition for operation (LCO) requirements (LCO 3.0.1 through 3.0.7; SR 4.0.1 through 4.0.4).
- knowledge of TS bases that are required to analyze TS-required actions and terminology
- same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM)

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤1 hour action statements and the safety limits since reactor operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. ROs are typically expected to know the LCO statements and associated applicability information (i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS) in the example below).



Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

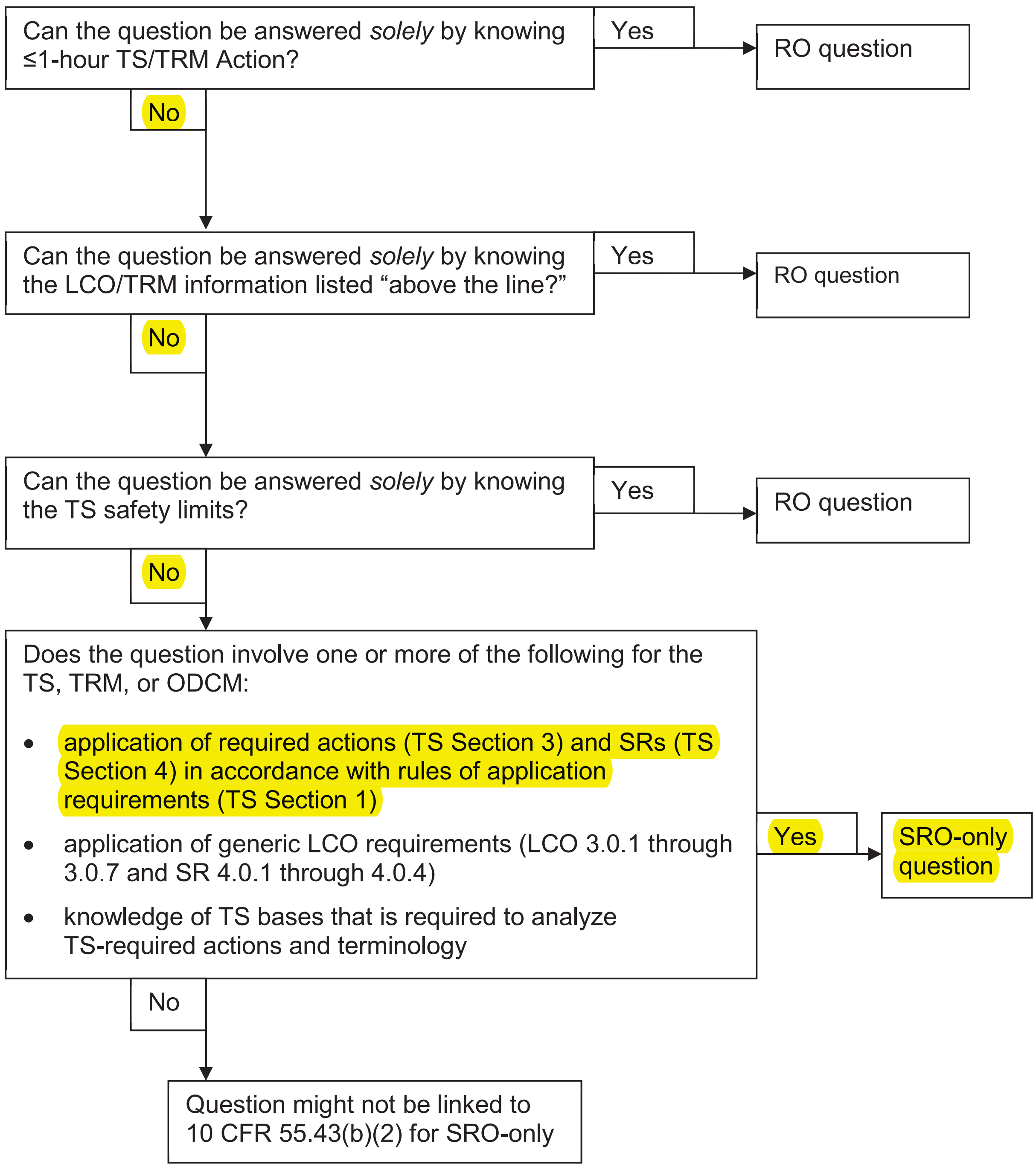
LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

Figure 2-1 Screening for SRO-Only Linked to 10 CFR 55.43(b)(2) (Technical Specifications)



94. G2.1.13 001/30004ADM/013.033.A.13/NEW/P-NORM/SRO/G2.1.13/3/F/3/ARB/ABG

Unit 1 is starting up with reactor power at 12% RTP.

An Abnormal entry is required to access the Drywell.

Based on the above conditions and IAW 31GO-OPS-005-0, Primary Containment Entry,

The MINIMUM level of approval REQUIRED to permit access to the Drywell will be from the __________ .

A. Shift Manager

B. Operations Director

C. RP/CH Manager

D. ✓ Plant Manager

94. G2.1.13 001

Description:

IAW NMP-OS-007, step 3.9.3 - Declares emergencies per the plant Emergency Plan (Commitment 5082 FNP). The ED has the following non delegable responsibilities per NMP-EP-141, Event Classification:

e. **Authorization for plant personnel to exceed 10CFR20 radiation** exposure limits.

IAW 34SO-N30-001-1, Main Turbine,

Step 7.3.4 Main Turbine High Vibration Trip Bypass / Reset

7.3.4.1 Bypass Main Turbine High Vibration Trip.

7.3.4.1.1 Obtain permission from the Operation's Director (or designee), AND notify the Plant Manager the vibrations trips are being bypassed.

IAW 31GO-OPS-005-0, Primary Containment Entry, Operations will ensure clearances:

6.4.2.3 That High Radiation Sources, eg., TIPs, have been positioned to permit access to the PRIMARY CONTAINMENT.

An Exclusion for Tagging the TIP(s) will be allowed IF TIP Probing is required AND ALL of the following conditions are met:

6.4.2.3.1 ALL TIPs have undergone a minimum of 72 Hour Decay Time.
6.4.2.3.2 Approval of **Manager RP/CHEM**.

7.2.1 - The Radiation Protection Foreman responsible for the containment entry will:

7.2.1.1 Confirm all the prerequisites of subsections 6.3 are satisfactorily met.
7.2.1.2 **IF pre-entry conditions are NOT met, obtain approval from the Plant Manager before an abnormal entry is made.**

SRO JUSTIFICATION:

The SRO is required to have detailed knowledge of the abnormal Primary Containment entry requirements and whose approval is required to make this entry. This approval is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant the facility requirements (whose permission is required) to perform an abnormal enter into Primary Containment (controlled area).

The "A" distractor is plausible since the Shift Manager approves plant personnel exceeding 10CFR20 radiation exposure limits and with the higher abnormal reactor power the applicant selecting this distractor.

The "B" distractor is plausible since the Operations Director approves bypassing the Main Turbine High Vibration trip if abnormally high vibrations are experienced and the applicant selecting this distractor.

The "C" distractor is plausible since RP/CH Manager approval is required to permit access to the Primary Containment if TIP Probing is required AND Operations has not performed a clearance tagout on the TIPs.

"D" is Correct.

94. G2.1.13 001

References provided to the applicant:

NONE

<u>K/A:</u>

2.1 Conduct of Operations

G2.1.13 Knowledge of facility requirements for controlling vital/controlled access.
(CFR: 41.10 / 43.5 / 45.9 / 45.10) 2.5 3.2

SRO only because of link to 10CFR55.43(b)(5):Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

<u>LESSON PLAN/OBJECTIVE:</u>

H-LT-LP-30004, Admin Procedures, **Ver. 16.0**, EO 013.033.A.13

<u>Reference(s) used to develop this question:</u>

34SO-N30-001-1, Main Turbine Operation, **Ver. 32.1**
NMP-OS-007, Conduct of Operations, **Ver. 13.1**
31GO-OPS-005-0, Primary Containment Entry, **Ver. 12.21**

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, “Changes, Tests and Experiments”
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure’s overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

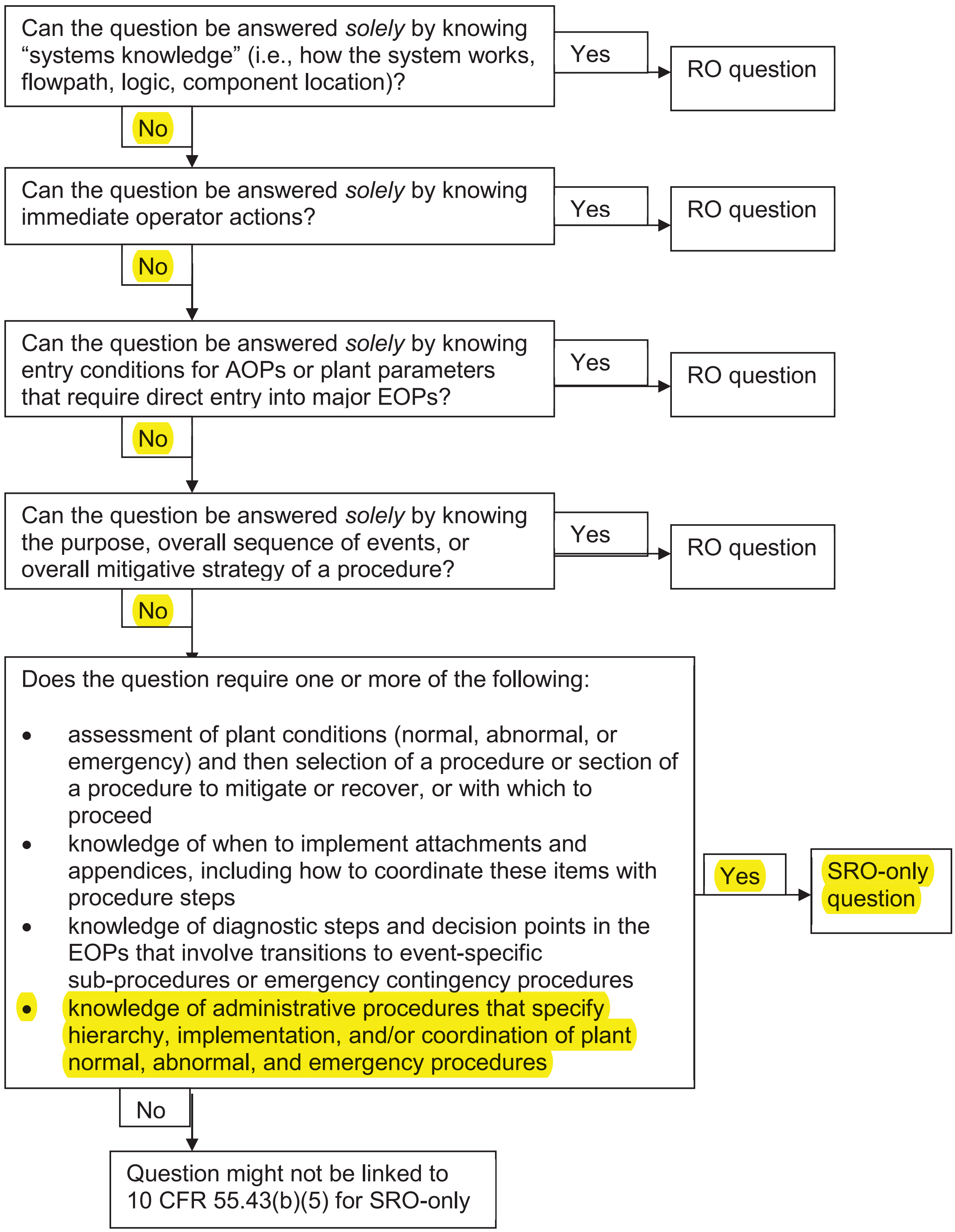
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)



95. G2.1.20 001/30003TSADM/300.049.A.01/MOD/P-NORM/SRO/G2.1.20/3/F/3/ARB/ABG

Core Spray pump 2B was in service when the Core Spray pump 2B Lockout Relay TRIPPED.

Maintenance investigates/repairs and the Core Spray pump 2B Lockout Relay is now ready to be reset.

Based on the above conditions,

The procedure which provides the list of personnel whose authorization is REQUIRED to RESET the Core Spray pump 2B Lockout Relay is __________ .

Of the listed individuals, the MINIMUM Authorization REQUIRED to reset the Core Spray pump 2B Lockout relay is the Shift Supervisor AND the __________ .

A✓ 31GO-OPS-021, Manipulation of Controls and Equipment;
Engineering Supervisor

B. 31GO-OPS-021, Manipulation of Controls and Equipment;
Operations Fix-It-Now (FIN) Supervisor

C. NMP-OS-007-001, Conduct of Operations Standards and Expectations;
Engineering Supervisor

D. NMP-OS-007-001, Conduct of Operations Standards and Expectations;
Operations Fix-It-Now (FIN) Supervisor

95. G2.1.20 001

Description:

31GO-OPS-021-0, step 7.3.1 states Lock-out relays and flags on protective relays that trip lock-out relays will NOT be reset UNTIL authorized by the **SS** and one of the following:

Shift Manager (SM) or higher

Engineering Supervisor or higher

Maintenance Team Leader (TL) (Supervisor)(Electrical) or higher

IAW NMP-MA-012, Conduct of Maintenance, step 3.10 - The Fix-It-Now (FIN) team primary responsibility is to address emergent work activities such that the scheduled and planned work is protected and the normal shop resources are not distracted from their assigned tasks.

IAW NMP-OS-007-001, Conduct of Operations Standards and Expectations, step 4.30.2 Expectations

1. Do not reset trip flags, thermal overloads or handswitch amber lights until directed by appropriate personnel after investigation has started. An investigation shall be performed by qualified personnel to determine the cause of the trip prior to further attempts to close the breaker or start associated equipment.

   a. Mechanical relay flags (for example, on 4160V breaker cubicle doors) occasionally drop out due to vibrations. IF a breaker is clearly not tripped and no associated alarms have occurred, the system operator may attempt to reset the flag. The relay flag provides indication only. IF a relay has actuated it should have resulted in an alarm or breaker trip. IF the relay flag will not reset, or it is apparent that the flag is repetitively dropping, a condition report should be submitted.

SRO JUSTIFICATION:

The SRO must have detailed knowledge of the authorization requirements to reset the lockout. An RO will know that the relay is required to have authorization, but the SRO will know who can and cannot authorize the reset. Since this procedure has different requirements for different types of relays, it will take additional knowledge from the SRO to answer this question.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to execute 31GO-OPS-021-0 procedure steps for resetting a lockout relay.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible since the Ops FIN Supervisor approves FIN work for maintenance activities.

The "C" distractor is plausible since this procedure provides guidance to reset relay flags but does not provide the required listed authorization personnel. The second part is plausible since it is correct.

The "D" distractor is plausible since this procedure provides guidance to reset relay flags but does not provide the required listed authorization personnel. The second part is plausible since the Ops FIN Supervisor approves FIN work for maintenance activities.

95. G2.1.20 001

References provided to the applicant:

NONE

K/A:

2.1 Conduct of Operations

G2.1.20 Ability to interpret and execute procedure steps.
(CFR: 41.10 / 43.5 / 45.12) 4.6 4.6

SRO only because of link to 10CFR55.43(b)(5):Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

LESSON PLAN/OBJECTIVE:

LT-LP-30003, Tech Specs / Administrative Controls, **Ver. 9.1**, EO 300.049.A.01

Reference(s) used to develop this question:

31GO-OPS-021, Manipulation of Controls and Equipment, **Ver. 4.10**
NMP-MA-012, Conduct of Maintenance, **Ver. 10.0**
NMP-OS-007-001, Conduct of Operations Standards and Expectations, **Ver. 16.2**
Modified question from HLT Database which was used on 2013 HLT-8 NRC Exam Q#87

ORIGINAL QUESTION

An event results in the Main Control Room being abandoned.

Control of **Unit 2** is established at the Unit 2 Remote Shutdown Panel (RSDP).

31RS-OPS-001-2, Shutdown From Outside Control Room, is in progress.

- o ALL RSDP Emergency Transfer Switches are in the "EMERGENCY" position

Subsequently, Unit 2 Drywell pressure increases to 3.0 psig.

A SO reports the following:

- o RHR pump 2A is NOT running

Maintenance reports RHR pump 2A Lockout Relay has TRIPPED.

The procedure that contains the guidance for whose AUTHORITY is required to reset the RHR pump 2A Lockout Relay is __________ .

With the RSDP Emergency Transfer Switches in the "EMERGENCY" position, RHR pump 2B is __________ .

A. NMP-OS-007-001, Conduct of Operations Standards and Expectations; operable

B. NMP-OS-007-001, Conduct of Operations Standards and Expectations; inoperable BUT available

C. 31GO-OPS-021, Manipulation of Controls and Equipment; operable

D.✓ 31GO-OPS-021, Manipulation of Controls and Equipment; inoperable BUT available

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, “Changes, Tests and Experiments”
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure’s overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps

- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures

- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge," such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure

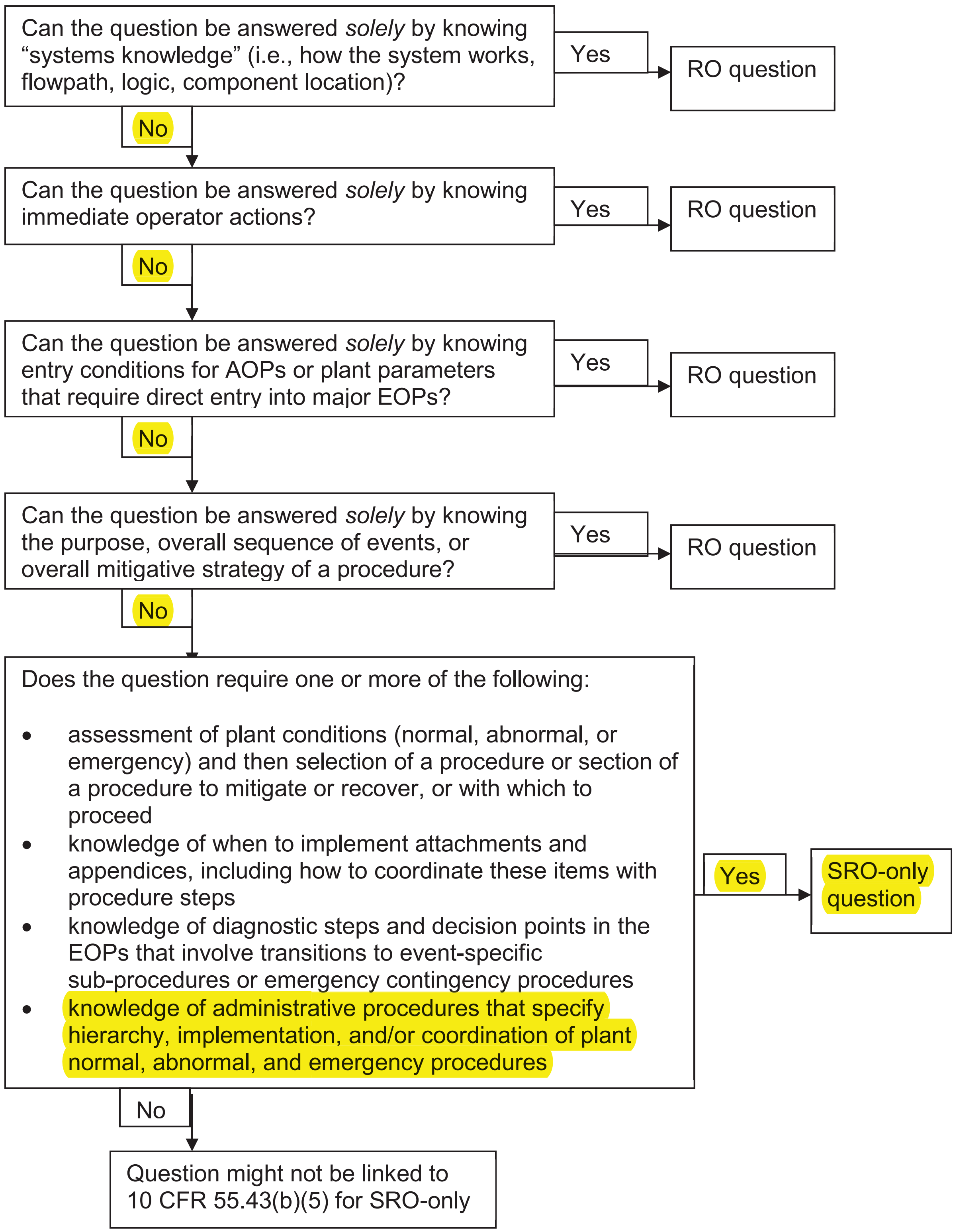
- any abnormal operating procedure (AOP) entry condition

- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)

- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)



96. G2.2.14 001/30005TS/300.010.A/BANK/P-NORM/SRO/G2.2.14/3/H/3/ARB/ABG

Unit 2 is operating at 100% RTP with the following conditions:

- o 34SV-E41-002-2, HPCI Pump Operability, is in progress
- o RHR B Loop is operating in Torus Cooling Mode

Subsequently, an NPO reports to the Shift Supervisor the following Off-Normal valve positions:

o 2E11-F028B, Torus Spray or Test Vlv,	OPEN
o 2E11-F024B, Full Flow Test Line Vlv,	OPEN
o 2E11-F048B, Hx Bypass Vlv,	CLOSED
o 2E41-F008, Test To CST Vlv,	OPEN
o 2E41-F011, Test To CST Vlv,	OPEN

31GO-OPS-006-0, Conditions, Required Actions and Completion Times, is entered.

The above valve positions will be restored to their Normal position on this shift.

Based on the above conditions,

ONLY __________ is considered INOPERABLE.

A Required Action Sheet (OPS-1349 Form) __________ REQUIRED to be initiated.

A. RHR;
is

B. RHR;
is NOT

C. HPCI;
is

D✓ HPCI;
is NOT

96. G2.2.14 001

Description:

Bruno, this was a Pre-submittal SRO question. Changes were incorporated based on your ES-401-9 comments.

IAW 34SV-SUV-018-2, Step 7.3.2.1 which states "WHEN a Loop of RHR is required to be operable, each Residual Heat Removal System Valve in the LPCI or Suppression Pool Cooling or Suppression Pool Spray or Drywell Spray flow path, that is NOT locked, sealed OR otherwise secured in position, is in the **correct position listed in Tables 3 and 4(5)** OR the Shift Supervisor had determined from other plant requirements, e.g., Shutdown Cooling required, that the Loop is operable." With **RHR in Torus Cooling**, RHR is still operable for LPCI.

Step 7.3.2.3, which states "WHEN HPCI is required to be operable, each HPCI System Valve in the flow path, that is NOT locked, sealed OR otherwise secured in position, is in the **correct position listed in Table 6**, unless the Shift Supervisor had determined from other plant requirements, HPCI aligned to Torus, that HPCI is operable." Table 6 requires 2E41-F008 & 2E41-F011 to be in the CLOSED positiion.

IAW 34SV-E41-002-2, HPCI Pump Operability, step 7.2.8 states "Notify the Shift Supervisor to declare HPCI INOP AND place it under an RAS." HPCI is declared inop when the 2E41-F008 is open due to its stroke time. Therefore, with 2E41-F008 & F011 open, HPCI is inoperable.

All of the above mentioned valves will reposition to there required positions on receipt of an initiation signal.

31GO-OPS-006 step 3.2.2 gives guidance for not writing a RAS when the inop SSC will be returned to OPERABLE status before the end of the shift. A RAS would be intiated if the INOP SSC will remain INOPERABLE for more than the current shift.

SRO JUSTIFICATION:

The SRO must have detailed procedure knowledge of 34SV-SUV-018 and 34SV-E41-002 to determine if the ECCS systems are inoperable based on the positions of the associated valves. The RO will know to report the valve positions to the SRO but the SRO will have the knowledge to decide whether or not the ECCS system is operable. The SRO also will have administrative knowledge of how to document when a system is Inoperable and that is expected to be returned to service either prior to the end of a shift or into the next shift.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to know the status of ECCS systems (operable verses inoperable) based strictly on valve positions and the governing document to control the status of the system (RAS).

The "A" distractor is plausible if the applicant remembers that some ECCS systems are inoperable when certain valves are not in their operable (normal) position and believes with 2E11-F048B, RHR Heat Exchanger Bypass valve closed, that RHR Loop B is inoperable. The second part is plausible since the system is INOP however 31GO-OPS-006 step 4.3.3 gives guidance for not writing a RAS since the system will be returned to OPERABLE status before the end of the shift. This answer is also plausible if the INOP system were to remain INOPERABLE for more than the current shift.

The "B" distractor is plausible if the applicant remembers that some ECCS systems are inoperable when certain valves are not in their operable (normal) position and believes with 2E11-F048B, RHR Heat Exchanger Bypass valve closed, that RHR Loop B is inoperable. The second part is plausible since it is correct.

The "C" distractor is plausible since the first part is correct. The second part is plausible since the system is INOP however 31GO-OPS-006 step 4.3.3 gives guidance for not writing a RAS since the system will be returned to OPERABLE status before the end of the shift. This answer is also plausible if the INOP system were to remain INOPERABLE for more than the current shift.

"D" is Correct.

96. G2.2.14 001

References provided to the applicant:

NONE

K/A:

2.2 Equipment Control

G2.2.14 Knowledge of the process for controlling equipment configuration or status.
(CFR: 41.10 / 43.3 / 45.13) 3.9 4.3

SRO only because of link to 10CFR55.43(b)(5): Assessment of facility conditions and selection of appropriate procedure, recalling the action in the body of procedure and when to take the action.

LESSON PLAN/OBJECTIVE:

E41-HPCI-LP-00501, High Pressure Coolant Injection (HPCI), **Ver. 8.2**, LO H-OP-90000.007
E11-RHR-LP-00701, Residual Heat Removal System, **Ver. 11.1**, LO H-OP-90000.007
LT-LP-30005, Technical Specifications, **Ver. 10.8**, EO 300.010.A.06 & 300.006.A.27

Reference(s) used to develop this question:

34SV-SUV-018-2, ECCS Status Checks, **Ver. 7.0**
34SV-E41-002-2, HPCI Pump Operability, **Ver. 38.0**
31GO-OPS-006-0, Conditions, Required Actions, and Completion Times, **Ver 8.5**
Bank question from HLT Database which was used on 2015 HLT-9 NRC Exam Q#95

C. Facility Licensee Procedures Required To Obtain Authority for Design and Operating Changes in the Facility [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include the following:

- screening and evaluation processes under 10 CFR 50.59, “Changes, Tests and Experiments”
- administrative processes for temporary modifications
- administrative processes for disabling annunciators
- administrative processes for the installation of temporary instrumentation
- processes for changing the plant or plant procedures

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation Hazards That May Arise during Normal and Abnormal Situations, including Maintenance Activities and Various Contamination Conditions [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include the following:

- process for gaseous/liquid release approvals (i.e., release permits)
- analysis and interpretation of radiation and activity readings as they pertain to the selection of administrative, normal, abnormal, and emergency procedures
- analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles (e.g., radiation work permit requirements, stay time, and DAC hours).

E. Assessment of Facility Conditions and Selection of Appropriate Procedures during Normal, Abnormal, and Emergency Situations [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both (1) assessing plant conditions (normal, abnormal, or emergency) and then (2) selecting a procedure or section of a procedure to mitigate or recover, or with which to proceed. One area of SRO-level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure’s overall mitigative strategy or purpose.

The applicant’s knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure’s content is required to correctly answer the written test item. The following are examples:

- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- knowledge of diagnostic steps and decision points in the emergency operating procedures (EOPs) that involve transitions to event-specific sub-procedures or emergency contingency procedures
- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

SRO-only knowledge should not be claimed for questions that can be answered *solely* using “systems knowledge,” such as the following:

- how the system works
- system flowpath
- component locations

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of the following:

- the basic purpose of a procedure, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure
- any abnormal operating procedure (AOP) entry condition
- plant parameters that require direct entry into major EOPs (e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control)
- immediate operator actions of a procedure

Sections IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5) (Assessment and Selection of Procedures)

Can the question be answered *solely* by knowing "systems knowledge" (i.e., how the system works, flowpath, logic, component location)?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry into major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following:

- assessment of plant conditions (normal, abnormal, or emergency) and then selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed
- knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event-specific sub-procedures or emergency contingency procedures
- knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

97. G2.2.25 001/30005TS/300.006.A.27/BANK/TECH SPECS/SRO/G2.2.25/3/F/3/ARB/ABG

Which ONE of the following completes the statements concerning the TS Bases for the RPV Water Level Low (Level 3) function?

IAW **Unit 1** TS B3.3.1.1, RPS Instrumentation, the RPV Water Level Low (Level 3) trip function ensures that __________ .

IAW **Unit 1** TS B3.3.5.1, ECCS Instrumentation, the RPV Water Level Low (Level 3) function __________ used to prevent a spurious initiation of ADS due to spurious RPV Water Level Low Low Low (Level 1) signals.

A.✓ the heat energy generated in the fuel is substantially reduced before the fuel is uncovered;
is ALSO

B. the heat energy generated in the fuel is substantially reduced before the fuel is uncovered;
is NOT

C. enough time is available for the ECCS to start and reflood the reactor core before the Peak Cladding Temperature exceeds 2200°F;
is ALSO

D. enough time is available for the ECCS to start and reflood the reactor core before the Peak Cladding Temperature exceeds 2200°F;
is NOT

97. G2.2.25 001

Description:

IAW TS Bases B3.3.1.1, Low RPV water level indicates the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, a reactor scram is initiated at Level 3 to substantially reduce the heat generated in the fuel from fission. The Reactor Vessel Water Level - Low, Level 3 Function is assumed in the analysis of the recirculation line break. The reactor scram reduces the amount of energy required to be absorbed and, along with the actions of the Emergency Core Cooling Systems (ECCS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

IAW B3.3.5.1, The Reactor Vessel Water Level - Low, Level 3 Function is used by the ADS only as a confirmatory low water level signal. ADS receives one of the signals necessary for initiation from Reactor Vessel Water Level - Low Low Low, Level 1 signals. In order to prevent spurious initiation of the ADS due to spurious Level 1 signals, a Level 3 signal must also be received before ADS initiation commences.

SRO JUSTIFICATION:

The SRO must have detailed bases knowledge of the RPV water level low (Level 3) function to answer this question. This knowledge exceeds the RO knowledge of bases requirement.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to have knowledge of the TS bases for LCO 3.3.1.1 & 3.3.5.1.

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second part is plausible if the applicant does not remember the TS Bases for the low level signal of Level 3 being part of the ADS initiation logic.

The "C" distractor is plausible since this is the bases for Level 1 initiation. The second part is correct.

The "D" distractor is plausible since this is the bases for Level 1 initiation. The second part is plausible if the applicant does not remember the TS Bases for the low level signal of Level 3 being part of the ADS initiation logic..

97. G2.2.25 001

References provided to the applicant:

NONE

K/A:

2.2 Equipment Control

G2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. (CFR: 41.5 / 41.7 / 43.2) 3.2 4.2

SRO only because of link to 10CFR55.43(b)(2): Facility operating limitations in the technical specifications and their bases.

LESSON PLAN/OBJECTIVE:

LT-LP-30005, Technical Specifications, **Ver. 10.8**, EO 300.006.A.27

Reference(s) used to develop this question:

U1 TS Bases 3.3.1.1, RPS Instrumentation, RWL - Low, Level 3, **Revision 16**
U1 TS Bases 3.3.5.1, ECCS Instrumentation, RWL - Low, Level 3, **Revision 84**
Bank question from HLT Database which was used on 2011 ILT-6 NRC Exam Q#91

II. Examples of additional knowledge and abilities as they pertain to an SRO license and the 10 CFR 55.43(b) topics [ES-401, Section D.1.c]**:**

A. Conditions and limitations in the facility license. [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include:

- Reporting requirements when the maximum licensed thermal power output is exceeded.
- Administration of fire protection program requirements such as compensatory actions associated with inoperable sprinkler systems, fire doors, etc.
- The required actions for not meeting administrative controls listed in Technical Specification (TS) Section 5 or 6, depending on the facility (e.g., shift staffing requirements).
- National Pollutant Discharge Elimination System (NPDES) requirements, if applicable.
- Processes for TS and FSAR changes.

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

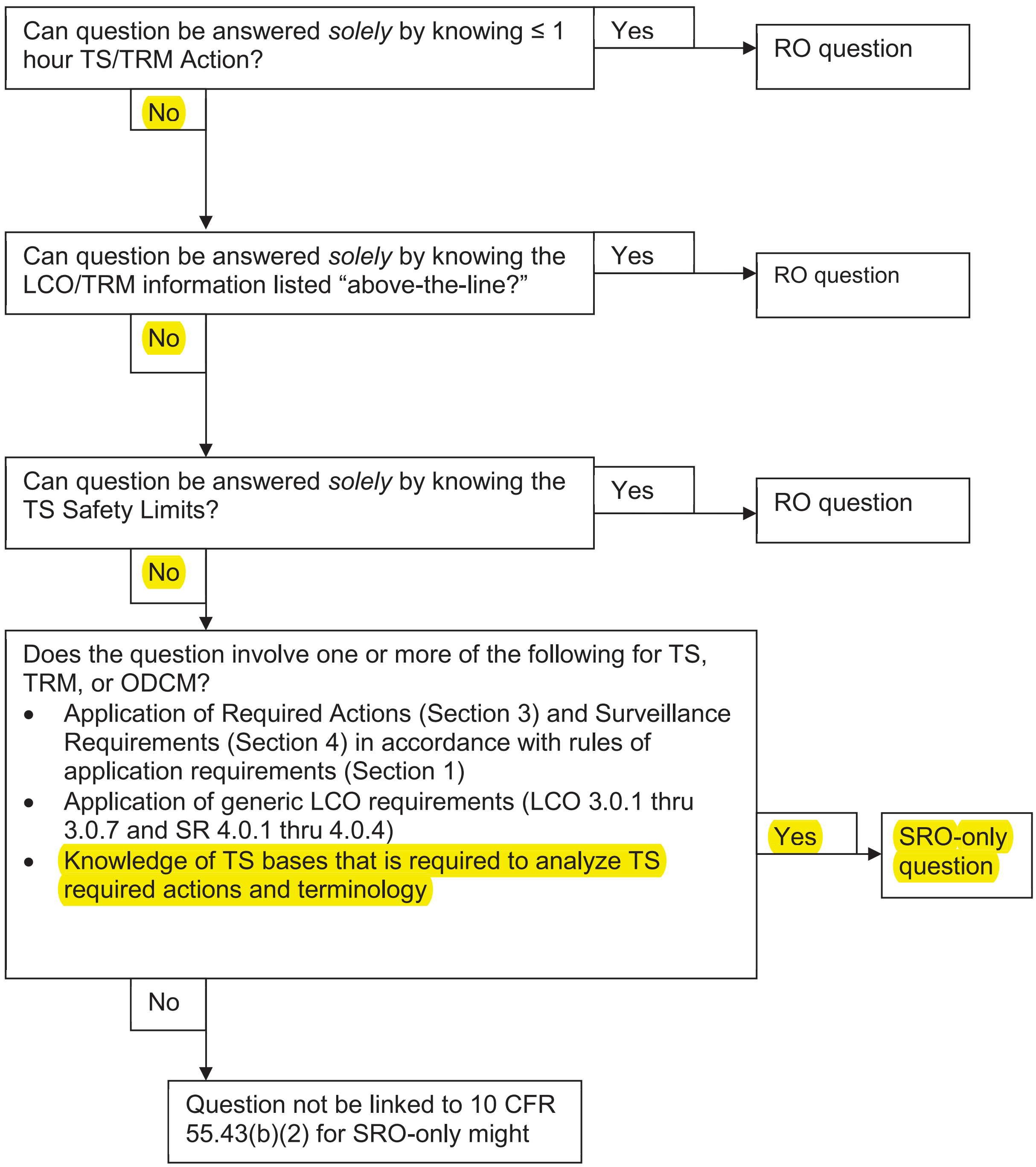
Some examples of SRO exam items for this topic include:

- Application of Required Actions (Section 3) and Surveillance Requirements (SR) (Section 4) in accordance with rules of application requirements (Section 1).
- Application of generic Limiting Condition for Operation (LCO) requirements (LCO 3.0.1 thru 3.0.7; SR 4.0.1 thru 4.0.4).
- Knowledge of TS bases that are required to analyze TS required actions and terminology.
- Same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM).

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤ 1 hour action statements and the safety limits since Reactor Operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. RO's are typically expected to know the LCO statements and associated applicability information, i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS; see example below)

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)



98. G2.3.12 001/01301PC/300.010.A.12/BANK/TECH SPECS/SRO/G2.3.12/3/H/3/ARB/ABG

Unit 1 is in Mode 2 at 9% RTP to inspect the Drywell for leakage.

Upon Drywell entry, it is identified that the INNER airlock door seal is no longer intact.

A Required Action Statement (RAS) is written for the INNER airlock door.

- o The OUTER airlock door has been verified to be locked closed
- o Parts to repair the INNER airlock door seal will be onsite in 60 days

Based on the above conditions and IAW Tech Spec 3.6.1.2, Primary Containment Airlock, and Bases,

When performing verification requirements, the next TS verification __________ be accomplished administratively (i.e. without entering the Drywell Access).

While Maintenance is actively repairing the INNER Airlock door,
the OUTER Airlock door __________ .

A. can NOT;
must be immediately closed after each entry and exit

B. can NOT;
can be left open while Maintenance workers are in the airlock;

C.✓ can;
must be immediately closed after each entry and exit

D. can;
can be left open while Maintenance workers are in the airlock;

98. G2.3.12 001

Description:

TS 3.6.1.2 Condition A.1, requires the outer airlock door closed within one hour and locked within 24 hours. TS Bases B3.6.1.2 Actions, states, The ACTIONS are modified by Note 1, which allows entry and exit to perform repairs of the affected air lock component. If the outer door is inoperable, then it may be easily accessed to repair. If the inner door is the one that is inoperable, however, then a short time exists when the containment boundary is not intact (during access through the outer door). The allowance to open the OPERABLE door, even if it means the primary containment boundary is temporarily not intact, is acceptable due to the low probability of an event that could pressurize the primary containment during the short time in which the OPERABLE door is expected to be open. The OPERABLE door must be ***immediately closed after each entry and exit***. While Maintenance is actively repairing the INNER Airlock door, the OUTER Airlock door can NOT be left open.

Required Action A.3 ensures that the air lock with an inoperable door has been isolated by the use of a locked closed OPERABLE air lock door. This ensures that an acceptable primary containment leakage boundary is maintained. The Completion Time of once per 31 days is based on engineering judgment and is considered adequate in view of the low likelihood of a locked door being mispositioned and other administrative controls. Required Action A.3 is modified by a Note that applies to air lock doors located in high radiation areas or areas with limited access due to inerting and allows these doors to be verified locked closed by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of the door, once it has been verified to be in the proper position, is small.

SRO JUSTIFICATION:

The SRO must have detailed knowledge of TS Bases concerning the inoperable Airlock door and must properly apply the note for 3.6.1.2 A.3 to answer this question. This is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by requiring the applicant to have knowledge of how to control the containment airlock doors during containment entry to protect personnel from the radiological hazards located beyond the containment airlock doors.

The "A" distractor is plausible if the applicant does not apply the note above the requirement for the door to be checked every 31 days. There are multiple instances in TS that do not have the same note for this type of check. The second part is plausible since it is correct.

The "B" distractor is plausible if the applicant does not apply the note above the requirement for the door to be checked every 31 days. There are multiple instances in TS that do not have the same note for this type of check. The second part is plausible if the applicant does not remember the TS Bases requirement for only allowing the operable door to be opened then closed after each entry/exit. Also plausible since leaving the outer door open could be considered a safety requirement for preventing personnel from getting trapped in the airlock.

"C" is Correct.

The "D" distractor is plausible since the first part is correct. The second part is plausible if the applicant does not remember the TS Bases requirement for only allowing the operable door to be opened then closed after each entry/exit. Also plausible since leaving the outer door open could be considered a safety requirement for preventing personnel from getting trapped in the airlock.

98. G2.3.12 001

References provided to the applicant:

NONE

K/A:

2.3 Radiation Control

G2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10) 3.2 3.7

SRO only because of link to 10CFR55.43(b)(2): Facility operating limitations in the technical specifications and their bases.

LESSON PLAN/OBJECTIVE:

H-LT-NL-LP-T23-PC-01301, Primary Containment, **Ver. 9.0**, EO 300.010.A.12

Reference(s) used to develop this question:

U1 Technical Specifications 3.6.1.2, Primary Containment Airlock, **Amendment 195**
U1 Technical Specifications Bases B3.6.1.2, **Rev. 0.0**
Bank question from HLT Database which was used on 2015 ILT-9 NRC Exam Q#97

II. Examples of additional knowledge and abilities as they pertain to an SRO license and the 10 CFR 55.43(b) topics [ES-401, Section D.1.c]**:**

A. Conditions and limitations in the facility license. [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include:

- Reporting requirements when the maximum licensed thermal power output is exceeded.
- Administration of fire protection program requirements such as compensatory actions associated with inoperable sprinkler systems, fire doors, etc.
- The required actions for not meeting administrative controls listed in Technical Specification (TS) Section 5 or 6, depending on the facility (e.g., shift staffing requirements).
- National Pollutant Discharge Elimination System (NPDES) requirements, if applicable.
- Processes for TS and FSAR changes.

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

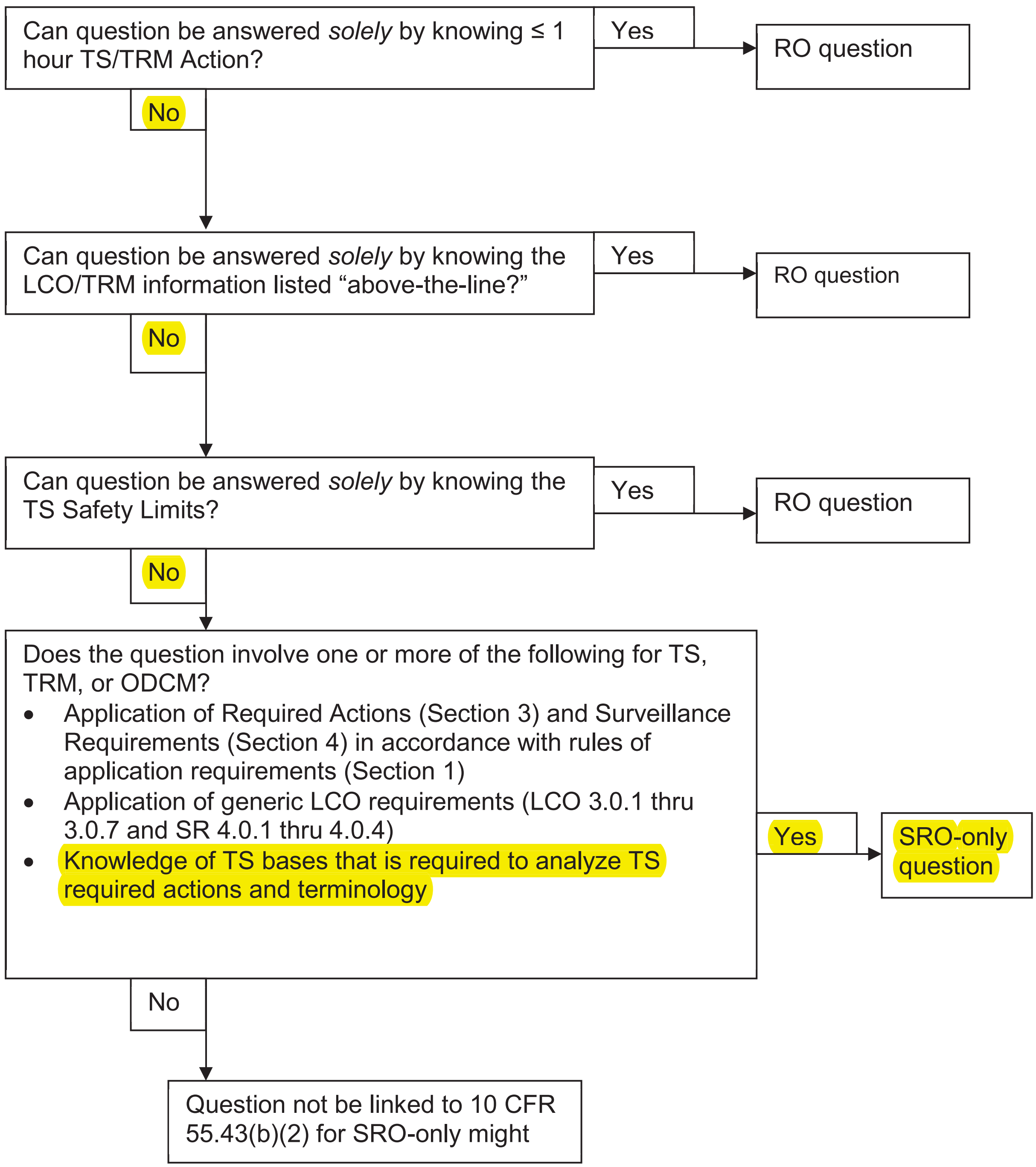
Some examples of SRO exam items for this topic include:

- Application of Required Actions (Section 3) and Surveillance Requirements (SR) (Section 4) in accordance with rules of application requirements (Section 1).
- Application of generic Limiting Condition for Operation (LCO) requirements (LCO 3.0.1 thru 3.0.7; SR 4.0.1 thru 4.0.4).
- Knowledge of TS bases that are required to analyze TS required actions and terminology.
- Same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM).

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤ 1 hour action statements and the safety limits since Reactor Operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. RO's are typically expected to know the LCO statements and associated applicability information, i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS; see example below)

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)



99. G2.3.15 001/05101D11/300.006.C.02/BANK/TECH SPECS/SRO/G2.3.15/3/H/3/ARB/ABG

Unit 2 is operating at 85% RTP when an event occurs requiring the Drywell to be vented using 2T48-F319 and 2T48-F320, Drywell Vent valves.

Drywell pressure is being maintained between 0.5 psig and 1.0 psig.

Based on the above conditions, which ONE of the following completes the statements concerning 2T48-F319 and 2T48-F320 and the TS Bases for 2D11-K621A & B, Drywell Radiation Monitors?

If 2D11-K621A & B, Drywell Radiation Monitors rises to 145 R/hr, 2T48-F319 and 2T48-F320 will __________ .

IAW TS Bases 3.3.6.1, the Drywell Radiation - High function, __________ .

A.✓ close;
is NOT assumed in the U2 FSAR accident or transient analysis because the MSIV leakage path is MORE limiting.

B. close;
is assumed in the U2 FSAR accident or transient analysis because the MSIV leakage path is LESS limiting.

C. remain open;
is NOT assumed in the U2 FSAR accident or transient analysis because the MSIV leakage path is MORE limiting.

D. remain open;
is assumed in the U2 FSAR accident or transient analysis because the MSIV leakage path is LESS limiting.

99. G2.3.15 001

Description:

Two Drywell channel monitors (2D11-K621A & B, Drywell Radiation Monitors) have a range of 1 to 10^7 R/hr and provide alarms, indication, and isolations. At 138 R/hr in the drywell, all the primary containment 18" purge and vent valves close. The valves are; Drywell purge, T48-F307 and F308; Torus purge, T48-F309 and F324; **Drywell vent, T48-F319 and F320**; and Torus vent T48-F318 and F326. If the valves are closed on a High Radiation signal, then an amber light above the valve indicator on H11-P602 will illuminate to tell the operator that the valves closed, or would have closed, on high radiation in the drywell.

IAW TS Bases 3.3.6.1, High drywell radiation indicates possible gross failure of the fuel cladding. Therefore, when Drywell Radiation - High is detected, an isolation is initiated to limit the release of fission products. However, this Function is **not** assumed in any accident or transient analysis in the FSAR because other leakage paths (e.g., MSIVs) are more limiting.

SRO JUSTIFICATION:

The SRO must have detailed knowledge of Tech Spec bases concerning DW radiation monitors to answer this question. This is above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant to have knowledge of the TS Bases for the radiation monitoring system (Drywell Radiation Monitors).

"A" is Correct.

The "B" distractor is plausible since the first part is correct. The second is plausible if the applicant thinks Drywell radiation high would be assumed in the analysis just because Drywell radiation has such a high range of indication.

The "C" distractor is plausible since 145 R/hr is less than the value for Fission Product Barrier, Fuel Clad of 1400 R/hr, therefore, not high enough for an isolation. The second part is correct.

The "D" distractor is plausible since 145 R/hr is less than the value for Fission Product Barrier, Fuel Clad of 1400 R/hr, therefore, not high enough for an isolation. The second is plausible if the applicant thinks Drywell radiation high would be assumed in the analysis just because Drywell radiation has such a high range of indication.

99. G2.3.15 001

References provided to the applicant:

NONE

K/A:

2.3 Radiation Control

G2.3.15 Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.
(CFR: 41.12 / 43.4 / 45.9) 2.9 3.1

SRO only because of link to [10 CFR 55.43(b)(2)]: Facility Operating Limitations in the Technical Specifications and Their Bases

LESSON PLAN/OBJECTIVE:

H-LT-LP-D11-PRM-10007, Process Radiation Monitors, **Ver. 7.0**, LO 300.006.C.02

Reference(s) used to develop this question:

NMP-EP-141-002-F01, EAL Classification Matrix, Hot Conditions, **Ver. 1.1**
Bank question from HLT Database which was used on 2011 ILT-6 NRC Exam Q#98

II. Examples of additional knowledge and abilities as they pertain to an SRO license and the 10 CFR 55.43(b) topics [ES-401, Section D.1.c]**:**

A. Conditions and limitations in the facility license. [10 CFR 55.43(b)(1)]

Examples of SRO exam items for this topic include:

- Reporting requirements when the maximum licensed thermal power output is exceeded.
- Administration of fire protection program requirements such as compensatory actions associated with inoperable sprinkler systems, fire doors, etc.
- The required actions for not meeting administrative controls listed in Technical Specification (TS) Section 5 or 6, depending on the facility (e.g., shift staffing requirements).
- National Pollutant Discharge Elimination System (NPDES) requirements, if applicable.
- Processes for TS and FSAR changes.

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

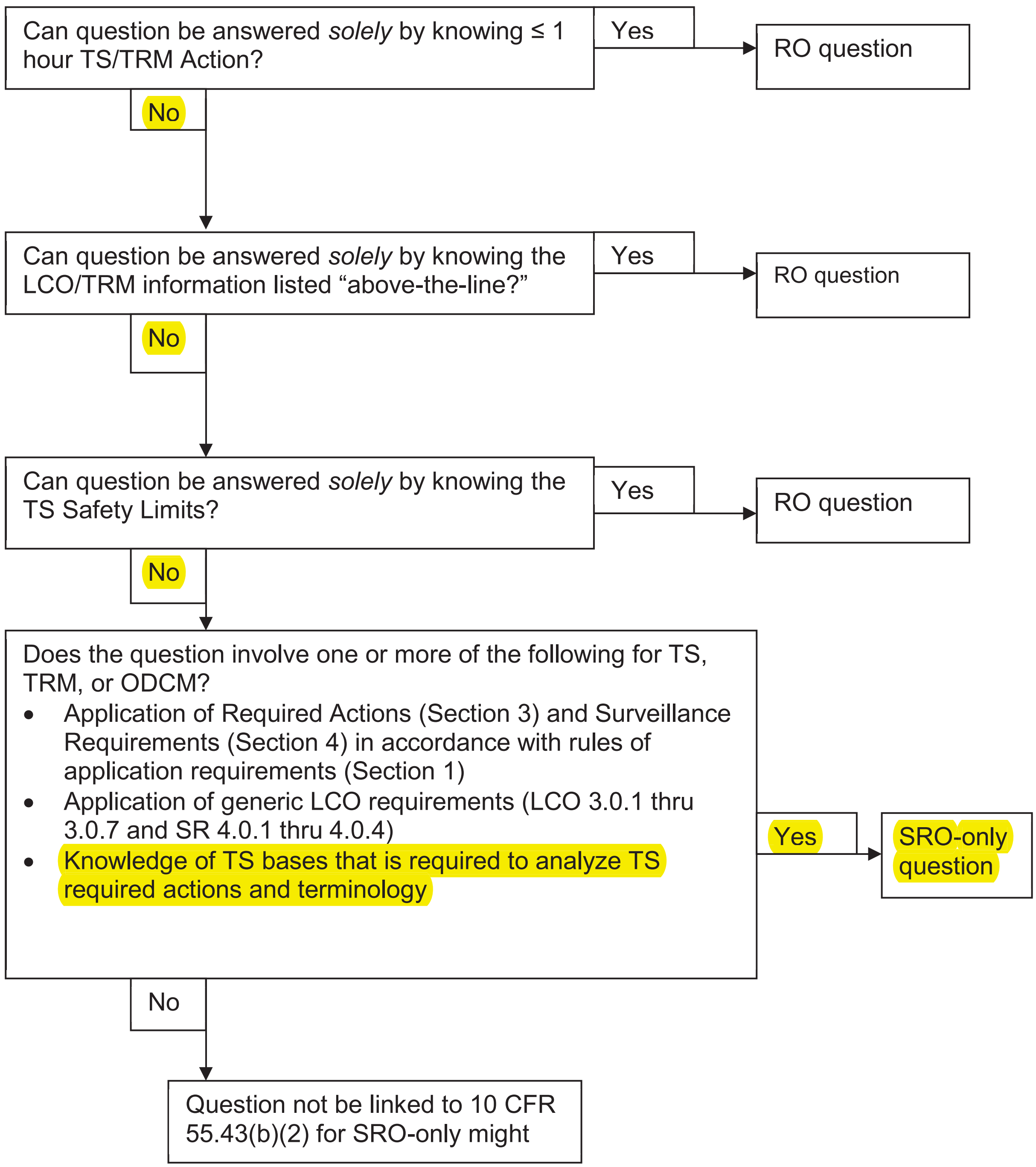
Some examples of SRO exam items for this topic include:

- Application of Required Actions (Section 3) and Surveillance Requirements (SR) (Section 4) in accordance with rules of application requirements (Section 1).
- Application of generic Limiting Condition for Operation (LCO) requirements (LCO 3.0.1 thru 3.0.7; SR 4.0.1 thru 4.0.4).
- Knowledge of TS bases that are required to analyze TS required actions and terminology.
- Same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM).

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤ 1 hour action statements and the safety limits since Reactor Operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. RO's are typically expected to know the LCO statements and associated applicability information, i.e., the information above the double line separating the ACTIONS from the LCO and associated applicability statements (standardized TS; see example below)

Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)



100. G2.4.29 001/20101EP/001.017.A/BANK/P-EP/SRO/G2.4.29/3/H/4/ARB/ABG

Unit 1 is operating at 100% RTP when the following events occur:

10:00 RCIC Steam line break occurs in the Reactor Building with 1E51-F007 & F008, Isolation Valves, failing to close
10:01 Manual scram inserted and very few rods insert into the core
10:05 One (1) Reactor Building Area Temperature exceeds Max Safe Operating value
10:10 Drywell Wide Range Radiation Monitors (DWRRM) indicate 8000 R/hr
10:15 RWL is -165 inches and steady
10:20 Drywell pressure is 2.6 psig and slowly rising
10:25 Projected Dose at the Site Boundary is 1050 mRem TEDE and 3000 mRem CDE (thyroid)

Based on the above conditions, which ONE of the following is the EARLIEST listed time that sufficient plant conditions exist to provide enough information to declare a GENERAL Emergency, WITHOUT basing the declaration on ED judgment?

Reference Provided

A.✔ 10:10

B. 10:15

C. 10:20

D. 10:25

You have completed the test!

100. G2.4.29 001

Description:

For these conditions a General emergency is first declared when 2 fission product barriers are lost and the loss/potential exists for the third barrier. The first & second barriers (Loss of Containment & Loss of RCS) are lost when the RCIC Steam line break occurs with 1E51-F007 & F008, isolaion valves, failing to close. The third barrier (Fuel Clad) is lost when the DW rad monitors read 8000 R/hr which is also greater than 1400 R/hr. This constitues an General Emergency. At 1015, RWL is less than TAF (-155") which is a potential loss of another third barrier (Fuel Clad) and therefore constitutes a General Emergency. At 10:20, DW pressure is > 1.85 psig which is another loss of RCS barrier and at 10:25 offsite dose rates exceed General Emergency levels.

SRO JUSTIFICATION:

The SRO must realize what constitues a General Emergency and then advance through the different events and decide which barriers are lost and at what time they occur. EALs are above the RO knowledge level.

K/A JUSTIFICATION:

This question satisfies the K/A statement by asking the applicant have knowledge of what constitutes a General Emergency as part of the emergency plan.

"A" is Correct.

The "B" distractor is plausible since this is a loss of the Fuel Clad Barrier and if the applicant remembers what constitutes a General Emergency, may think that since 3 barriers are now lost that a General exists at 10:15, which it does, just not the earliest.

The "C" distractor is plausible since this is a loss of the RCS Barrier and if the applicant remembers what constitutes a General Emergency, may think that now 3 barriers are lost and a General exists at 10:20.

The "D" distractor is plausible since this is the conditions that constitutes a General Emergency at 10:25, just not the earliest.

You have completed the test!

100. G2.4.29 001

References provided to the applicant:

NMP-EP-141-002-F01, EAL Classification Matrix, Hot Conditions

K/A:

2.4 Emergency Procedures / Plan

G2.4.29 Knowledge of the emergency plan.
(CFR: 41.10 / 43.5 / 45.11) 3.1 4.4

SRO only because of link to 10 CFR 55.43(b)(6): Procedures and Limitations Involved in Initial Core Loading, Alterations in Core Configuration, Control Rod Programming, and Determination of Various Internal and External Effects on Core Reactivity - evaluation of core conditions and emergency classifications based on core conditions.

LESSON PLAN/OBJECTIVE:

EP-LP-20101, Initial/Terminating Activities, **Ver. 1.1**, TO 001.017.A

Reference(s) used to develop this question:

NMP-EP-141-002-F01, EAL Classification Matrix, Hot Conditions, **Ver. 1.1**
Bank question from HLT Database which was used on 2012 ILT-7 NRC Exam Q#100

You have completed the test!

F. Procedures and Limitations Involved in Initial Core Loading, Alterations in Core Configuration, Control Rod Programming, and Determination of Various Internal and External Effects on Core Reactivity [10 CFR 55.43(b)(6)]

Some examples of SRO exam items for this topic include the following:

- evaluation of core conditions and emergency classifications based on core conditions
- administrative requirements associated with low-power physics testing processes
- administrative requirements associated with refueling activities, such as approvals required to amend core loading sheets or administrative controls of potential dilution paths and/or activities
- administrative controls associated with the installation of neutron sources
- knowledge of TS bases for reactivity controls

G. Fuel-Handling Facilities and Procedures [10 CFR 55.43(b)(7)]

Some examples of SRO exam items for this topic include the following:

- refuel floor SRO responsibilities
- assessment of fuel-handling equipment SR acceptance criteria
- prerequisites for vessel disassembly and reassembly
- decay heat assessment
- assessment of SRs for the refueling mode
- reporting requirements
- emergency classifications

This list does not include items that the RO may be responsible for at some sites, such as fuel-handling equipment and refueling related control room instrumentation operability requirements and AOP immediate actions. For example, an RO is required to stop the refueling process when communication is lost between the control room and the refueling floor; therefore, this task is both an RO and SRO responsibility, not an SRO-only responsibility.

III. Justification for Plant-Specific Exemptions

The 25 SRO-only questions ***shall*** evaluate the additional K/As required for the higher license level in accordance with 10 CFR 55.43(b). [Section D.2.d of this examination standard]

NRC DRAFT

Facility: E. I Hatch **Scenario No.:** 12-1 **Op-Test No.:** 2019-301

Examiners: ______________ **Operators:** ______________ SRO
______________ ______________ RO
______________ ______________ BOP

Initial Conditions. Unit 2 is operating at 61% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.

Turnover: Continue startup and place RFPT 2A in service, starting at step 7.1.11.2.8 of 34SO-N21-007-2. Once RFPT 2A is in service, raise reactor power to 75% RTP using Recirc flow.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Continue startup and place RFPT 2A in service, starting at step 7.1.11.2.8 of 34SO-N21-007-2.
2	mfC11_30B mf60311335	I (ATC)	Low suction pressure instrument failure resulting in CRD pump 2B tripping. Must start standby pump to restore system flow & pressure.
3	mf65031541 mfN61_73	C (BOP)	RFPT loop seal failure requiring manual opening of bypass valve to prevent Main Turbine trip on low vacuum.
4	mfE41_249 svoE41072 svoE41073 EGE41-3 EGE41-4	C (ATC) TS (SRO)	HPCI Steam Line breaks in the Rx bldg. HPCI isolation valves fail to auto close (**Critical Task**)
5	mfB31_37B	C (BOP) TS (SRO)	Recirc Pump 2B trips resulting in the plant operating in the Region of Potential Instabilities of the Power-to-Flow map
6	N/A	R (ATC)	Insert Control rods to exit the Region of Potential Instabilities.
7	mf65702209 mf65702227 mf65321987 mf65702209 mf65702227 svoT48140 (70/.75) svoT48142 (50/10) svoT48143 (50/10) svoT48147 (50/10) svoT48148 (50/10)	M (ALL)	Earthquake with a loss of SAT 2C and requiring a reactor scram prior to 98" in Torus. (**Critical Task**)
8	rfE51_234 mfN21_79A mfN21_79B mfN21_79C mfN21_87A mfN21_87B	C (ATC)	Loss of Condensate pumps and RFPTs. RCIC 2E51-F013 Failure to Auto Open requiring manual operation to inject prior to RWL reaching -180" (**Critical Task**)

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

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 1

Event Description: Place RFPT 2A in service, starting at step 7.1.11.2.8 of 34SO-N21-007-2.

Time	Position	Applicant's Actions or Behavior
15 Mins	SRO	Orders Operator to place RFPT 2A in service, starting at step 7.1.11.2.8 of 34SO-N21-007-2.
	BOP	• Enters 34SO-N21-007-2 at step 7.1.11.2.8.
		• Confirms M/A station is tracking actual Speed Setter (RFPT) speed. • Places the TMR Mode switch to M/A. • Confirms the M/A Station green light illuminates.
		NOTE: *Alarm RFP C005A DISCH FLOW LOW, (656-039), will clear when RFPT 2A is placed into service. MULTIPOINT TEMP RCDR 2T47-R611 TEMP HIGH, (657-072) may come in and clear. All are expected for this plant condition. If dispatched to RFPT area, SIMULATOR OPERATOR, wait 2 minutes, NOTIFY BOP there are no steam leaks in the RFPT area. This is a normal condition and the alarm will clear as the temperature decreases.*

	BOP	• Slowly changes the RFPT 2A M/A station to match RFP 2A AND the RFP 2B flow match.
		• Matches the input AND output of Pump A M/A Station by performing the following:
		  • Depresses the PF key AND read the controller output (PF lamp lit).
		  • Depresses the PF key so the input to the controller is displayed (PF lamp is off).
		  • Adjusts the manual output lever until the input AND output are matched on P603 panel.
		• Monitors RWL, RFPT 2A discharge pressure and RFPT 2A & 2B speed.

		NOTE: *Alarm 656-039, RFP C005A DISCH FLOW LOW, will clear when RFPT 2A is placed into service. Alarm 650-135, HEATER TROUBLE, may come in and clear. This is expected for this plant condition.*
	BOP	• Places RFP A M/A station in AUTO • As required, adjusts RFP A Speed Control Bias Setting to maintain RFPT 2A and 2B speed within 100 RPM. • Alarm RFPT CONTROLLER TROUBLE, (656-039) clears. • Informs SRO that RFPT 2A is in service in Automatic control.
		Simulator operator proceeds to the next event at the Chief Examiner's direction

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 2

Event Description: CRD pump trips due to low suction pressure instrument failure. Must start standby pump to restore system flow & pressure.

Time	Position	Applicant's Actions or Behavior
10 Mins		*At the Chief Examiner's direction, Simulator Operator enters (**RB-2**) malfunction mf60311335 CRD B Suction Pressure Low alarm. ENSURE Event Trigger **EGC11-11** ACTIVATES when CRD B Suction Pressure Low alarms.*
	ATC	• Recognizes the following occurs: • CRD PUMP B SUCTION PRESSURE LOW, (603-146) alarms • CRD PUMP 2B BREAKER TRIP, (603-128) alarms • CRD pump 2B is tripped • CRD HYD TEMP HIGH, (603-140) alarms • CRD ACCUMULATOR PRESS LOW OR HIGH, (603-148) alarms ~ 1.5 minutes later (will NOT alarm if CRD 2B is started expeditiously).
	SRO/ATC	• Dispatches SO/Maintenance to determine the cause of the low suction pressure condition for CRD pump 2B.
	SRO	• Directs the ATC to enter 34AB-C11-001-2, Loss of CRD, and start CRD pump 2A.
		NOTE: *The Abnormal procedure requires charging water header to be restored within 20 minutes.*
	ATC	• Enters 34AB-C11-001-2, Loss of CRD • Places 2C11-R600, CRD Flow Control, in Manual • Decreases 2C11-R600 output to zero • Manually starts CRD pump 2A • CHARGING WATER PRESSURE HIGH, (603-139) may come in and then clear on pump start • Increases system flow to ~50 gpm • Transfers 2C11-R600 to Automatic • Notifies SRO CRD pump 2A is in service • May place CRD pump 2B switch to stop, which clears CRD PUMP 2B BREAKER TRIP, (603-128) alarm.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 2

Event Description: CRD pump trips due to low suction pressure instrument failure. Must start standby pump to restore system flow & pressure.

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	• Dispatches an SO to check CRD temperatures and Accumulator pressures locally.
		Simulator Operator, if dispatched to check Accumulator pressures, wait until after CRD pump 2A is started AND ALL Accumulator alarms are clear, THEN report all accumulator pressure are > 980 psig.
	SRO	May review TS 3.1.5 for inop accumulators and since all accumulator pressures are > 980 psig, does NOT declare any accumulators inop.
		Simulator Operator reports that: • *If the CRD High Temp Alarm is still lit, report that 1 CRD drive (26-35) is > 250°F* • *If the CRD High Temp Alarm is NOT lit, report that all temps are < 250°F* • *Suction pressure for CRD pump 2B is 22 psig and there is NO apparent problem with the suction line-up or suction filter.*
		Simulator Operator, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.:** 12-1	**Event No.:** 3	
Event Description:	RFPT loop seal failure.		

Time	Position	Applicant's Actions or Behavior
10 Min		*SIMULATOR OPERATOR: At the direction of the Chief Examiner, NOTIFY ATC as Chemistry and request Off Gas Flow. When ATC is at the P600 Panel, ACTIVATE (**RB-3**)* • *mf65031541 "RFP Loop Seal Level Low (Annunciator On)"* • *mfN61_73 "Main Condenser Air In-leakage"* ***NOTE:*** *It takes approximately 15 minutes for vacuum to degrade to 22.3 inches.*
	BOP	• Recognize RFP LOOP SEAL LEVEL LOW, (650-319), annunciator.

	BOP	• Respond to annunciator RFP LOOP SEAL LEVEL LOW, (650-319)
		  • Dispatches an SO to 2H21-P216 to confirm 2N22-F398, RFP Bracket Drain Loop Seal Fill Valve is open.
		  • Monitors vacuum at 2H11-P650, on 2N21-R602.
		• Dispatches an SO to confirm seal water lineup and pressures IAW 34SO-N21-007-2, Condensate and Feedwater System.
		
		SIMULATOR OPERATOR: When requested NOTIFY the BOP that "Seal water pressures are normal AND at 2H21-P216, 2N22-F398, RFP Bracket Drain Loop Seal Fill Valve is open."

	ATC	Recognize PRETREATMENT O/G RADIATION DOWNSCALE/INOP, (601-428), annunciator.

	BOP	• Monitors Inlet Flow to Stack on 2N62-P600.
		  • Receives INLET FLOW TO STACK HIGH, (600-020).
		  • Monitors Inlet flow to Stack at 2N62-P600, on 2N21-R604.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 3

Event Description: RFPT loop seal failure.

Time	Position	Applicant's Actions or Behavior
	SRO	May direct entry into 34AB-N61-002-2, Main Condenser Vacuum Low, abnormal.
	ATC	If directed, may REDUCE reactor power per 34GO-OPS-005-2, Power Changes, to establish and maintain vacuum greater than 25 in. Hg.
		*SIMULATOR OPERATOR: **ENSURE** Event Trigger **EGN21-2** deletes mfN61_73 when* • *2N21-F265 is closed* *Then 45 seconds later, DELETES mf65031541.*
	BOP	• With seal water pressures normal, will be required to close 2N21-F265, RFP Loop Seal Outlet Isol Vlv after 5 minutes of alarm RFP LOOP SEAL LEVEL LOW, (650-319), being received. • With vacuum degrading may close 2N21-F265 sooner to reverse degrading vacuum condition.
	BOP	• Opens 2N21-F265 when RFP LOOP SEAL LEVEL LOW, (650-319) clears.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 3

Event Description: RFPT loop seal failure.

Time	Position	Applicant's Actions or Behavior
	BOP	May receive the following alarms due to Flow to Stack high on 2N62-P600 and will clear when Flow to Stack returns to normal: • PREFILTER DIFF PRESS HIGH, (600-031) • AFTER FILTER DIFF PRESS HIGH, (600-040)
	BOP	• Alarm INLET FLOW TO HOLDUP LINE HIGH, (600-020), clears when flow returns to normal.
		SIMULATOR OPERATOR; At Chief Examiners direction, proceed to the next event.

Op-Test No.: 2019-301	Scenario No.: 12-1	Event No.: 4	Page 8 of 28

Event Description: HPCI Steam Line breaks in the Rx Bldg. with failure to auto isolate the HPCI steam line requiring manual closure of isolation valves.

Time	Position	Applicant's Actions or Behavior
10 Min		*At the Chief Examiner's direction, Simulator operator, ENTER* ***(RB-4)*** *mfE41_249, HPCI Steam Line, break 1.35/0.50.*
	ALL	• Receives the following annunciators ~45 seconds later: • DRYWELL/TORUS RCDR R627 TEMP HIGH, (650-204) • MULTIPOINT TEMP RCDR 2T41-R620 TEMP HIGH, (654-004) • MULTIPOINT TEMP RCDR 2T41-R626 TEMP HIGH, (657-025) • Receives the following ~75 seconds later: • LEAK DET DIFF TEMP HIGH, (601-321) • HPCI TURBINE TRIP SOLENOID ENERGIZED, (601-109) • HPCI ISOLATION TRIP LOGIC A INITIATED, (601-115) • HPCI ISOL TIMER INITIATED, (601-105) • HPCI ISOLATION TRIP LOGIC B INITIATED, (601-121) • SEC SYSTEM AUTO INITIATION SIGNAL PRESENT, (650-234)
		SIMULATOR OPERATOR; ENSURE Event Trigger ***EGE41-3*** *deletes HPCI F002 override open when 2E41-F002 control switch is placed to close.*
	ATC	Responds to the following annunciators: • HPCI STEAM LINE DIFF PRESS HIGH, (601-104) • HPCI TURBINE TRIP SOLENOID ENERGIZED, (601-109) • HPCI ISOLATION TRIP LOGIC A INITIATED, (601-115) **Time:** ____________ Responds to failure of HPCI Auto Isolation: • Places 2E41-F002 control switch to CLOSE. • Places 2E41-F003 control switch to CLOSE (**Critical Task**) *Critical Task is met when 2E41-F002 control switch is placed to close before exceeding Maximum Safe Operating Temperature (~ 7 minutes)* ***NOTE:*** *May close 2E41-F002 prior to receiving 601-115 and/or 601-121 listed above OR exceeding Maximum Safe Operating Temperature.* **Time:** ____________ • Informs SRO of failure of 2E41-F003 to close. Dispatches operator/Maintenance to investigate the leak.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 4

Event Description: HPCI Steam Line breaks in the Rx Bldg. with failure to auto isolate the HPCI steam line requiring manual closure of isolation valves.

Time	Position	Applicant's Actions or Behavior
	SRO	• Orders BOP to evaluate leak detection alarms on 2H11-P601. • Orders HPCI to be isolated. • Orders ATC/BOP to evacuate the Reactor Building. • May notify Maintenance for assistance in closing HPCI valve if ATC/BOP does NOT.

	SRO	Reviews TS 3.6.1.3, Primary Containment Isolation Valves, Condition A.1 and A.2 and determines:
		• 2E41-F003 INOP
		• 2E41-F002 must be closed and deactivated within 4 hours AND
		• 2E41-F002/F003 penetration must be verified ISOLATED every 31 days.
		• As time allows, contacts the Shift Support Supervisor to draft a Danger Tagout for 2E41-F002.
		
		Reviews TS 3.5.1, ECCS / RPV Water Inventory Control / RCIC.
		• IAW TS 3.5.1 Condition C,
		  • Declares HPCI inoperable,
		  • Must verify within one hour that RCIC is operable by administrative means
		  • Must restore HPCI to operable status within 14 days

		SIMULATOR OPERATOR; At Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 5

Event Description: Recirc Pump 2B trips resulting in the plant operating in the Region of Potential Instabilities of the Power-to-Flow map.

Time	Position	Applicant's Actions or Behavior
10 Min		*SIMULATOR OPERATOR;* *At Chief Examiner's direction, press **(RB-5)** to ACTIVATE mfB31_37B, Recirc Pump B ASD MV Input Breaker Trip.*
	ALL	• Acknowledges the following annunciators: • 602-201 ASD B TRIP WARNING • 601-202 ASD B FATAL FAULT • 601-208 ASD B TROUBLE • 601-227 RECIRC LOOP B OUT OF SERVICE
	SRO	• Notifies Plant Management, Load Dispatcher, and Engineering of Recirc Pump 2B Trip condition
		NOTE: *Heater Trouble Alarm (650-135) may alarm due to plant conditions.*
	BOP	Enters 34AB-B31-001-2, Reactor Recirculation Pump(s) Trip, Recirc Loops Flow Mismatch, Or ASD Cell Bypass for single Recirc pump trip.
	BOP	• Closes 2B31-F031B, Pump Disch Valve. • **Time: ______________** • Within 5 minutes, throttles 2B31-F031B, Pump Disch Valve OPEN • **Time: ______________** • Acknowledges the following annunciators: • 602-201 ASD B TRIP WARNING • 601-202 ASD B FATAL FAULT • 601-208 ASD B TROUBLE • 601-227 RECIRC LOOP B OUT OF SERVICE

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 5

Event Description: Recirc Pump 2B trips resulting in the plant operating in the Region of Potential Instabilities of the Power-to-Flow map.

Time	Position	Applicant's Actions or Behavior
		NOTE: *IAW 34AB-B31-001-2* *During single loop operation, WHEN the speed of the running pump decreases below approximately 35% speed, positive flow through the idle pump loop due to natural circulation overcomes the negative flow due to reverse flow. The total core flow summing circuitry will continue to subtract this positive idle loop flow from the running loop flow AND give a misleading LOW core flow indication. Total core flow can be calculated by adding the JET PUMP LOOP "A" AND the JET PUMP LOOP "B" flows.*
	SRO	• Has the operator determine if the plant is in the Region of Potential Instabilities of the Power to Flow Map. **Go to Event 6 for exiting the RPI.**
	SRO	• Based on the operating point on the Power to Flow Map, may direct the operator to insert the rods to the insert limit IAW Control Rod Movement sheets • References Tech Spec 3.4.1.A.1 and has 24 hours to meet requirements for Single Loop Operation
		Simulator Operator, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 6

Event Description: Insert Control rods to exit the Region of Potential Instabilities.

Time	Position	Applicant's Actions or Behavior
10 Min		***NOTE:*** *RBM Downscale alarm may alarm during this movement due to the significant rod worth of these rods. It is allowed to flag the RBM Downscale and Rod Block alarm.*

	ATC	• Determines that the plant is in the Region of Potential Instabilities (RPI) of the Power to Flow map.
		• If received, acknowledges APRM UPSCALE, (603-219) and ROD OUT BLOCK (603-238) annunciators
		• IAW Control Rod Movement sheets and 34GO-OPS-065-0, inserts Control rods to exit the RPI starting with **Step 25 Rod 42-35**
		  • Selects Rod
		  • Places Control Rod movement switch to the IN position
		  • Verifies Rod moves using Rod display information and Rx and Generator power decreasing.
		  • Releases Rod movement switch so that the control rod stops 1 position before the insert limit unless the insert limit is 00.
		  • Initials Rod Movement Sheet.
		  • Verifier, if available, Initials Rod movement sheet.
		  • Continues Control Rod movement until the RPI is exited
		• Notifies the SRO when the RPI is exited

		Simulator Operator, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-1 Event No.: 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
10 Min		*SIMULATOR OPERATOR, at Chief Examiners direction, ACTIVATE (**RB-6**)* *(Earthquake – malfunctions to (ON):* *mf65702209 Window 30 SEISMIC PEAK SHOCK RECORDER HIGH G LEVEL & mf65702227 Window 48 SEISMIC INSTRUMENTATION TRIGGERED* *&* *mfS11_227A SUT 2C FAILURE*
	ALL	The following annunciators are received: • 2H11-P657 SYSTEM TROUBLE, (650-224). • SEISMIC PEAK SHOCK RECORDER HIGH G LEVEL, (657-030). • SEISMIC INSTRUMENTATION TRIGGERED, (657-048). • 230 KV BREAKER TRIP, (653-218). • 4160V BUS 2F BRKR 135564, (652-217)
	BOP	• 2H11-P657 SYSTEM TROUBLE, (650-224), alarm on 2H11-P650 panel. • 230 KV BREAKER TRIP, (653-218) on 2H11-P653 panel. • Communicates both alarms to the SRO.
	SRO	Dispatches the BOP to Panels 2H11-P652, 2H11-P653 and 2H11-P657.
	BOP	• Enters 230 KV BREAKER TRIP, (653-218), on 2H11-P653 panel and informs the SRO that PCBs 179470 & 179480 supplying power to SAT 1C & SAT 2C have tripped open. • Enters 4160V BUS 2F BRKR 135564, (652-217) ◦ Confirms the alternate supply breaker is CLOSED AND 4160V Bus 2F is ENERGIZED. • As time permits, may notify GCC of tripped PCBs.

Op-Test No.: 2019-301 Scenario No.: 12-1 Event No.: 7		Page 14 of 28
Event Description:	Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.	

Time	Position	Applicant's Actions or Behavior
	BOP	Informs the SRO of the Seismic alarms and enters ARPs: 34AR-657-030-2 and 34AR-657-048-2 to perform the following actions: ***NOTE:*** *Actions for both ARPs are the same, except for checking the power supply.*
		• Dispatches Unit 1 NPO to panel 1H11-P701 to check for further indication of a seismic event by monitoring Peak Shock Annunciator, 1L51-R620, for 12.7 Hz amber lights (> 0.08g, OBE) and 12.7 Hz red lights (> 0.15g, DBE).
		SIMULATOR OPERATOR: After one minute, Notifies Unit 2 Control Room that you were in the Reactor Building and felt the floor vibrating.

	BOP	• May have the Unit 1 NPO check the following:
		  • Peak Shock Annunciator, 1L51-VDC-R620, plugged in on panel 1H11-P701.
		  • BRKR 3 on 120/208V Essential AC Cab., 1R25-S065.
		• May have I & C refer to Seismic Instrumentation Earthquake Response Manual, SX-18271, for guidance in analyzing seismic data.
		• Enters 34AB-Y22-002-0, Naturally occurring Phenomenon.
		• May inform the Shift Manager to evaluate an Emergency Classification.

	SRO	Directs the BOP to enter 34AB-Y22-002-0, Naturally occurring Phenomenon, if NOT already entered.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
		Simulator Operator: ***Immediately after being dispatched to check the Shock recorder on 1H11-P701 panel, inform the team that the following lights are illuminated:*** • *12.7 Hz **Amber** lights (> 0.08g, OBE)* *AND* • *12.7 Hz **Red** lights (> 0.15g, DBE)* *(Immediately is appropriate since this indicator is on Unit 1, but right next to the Unit 2 SRO desk. It is NOT simulated in the Simulator since it is a Unit 1 only instrument.)* ***NOTE:*** *With SAT 2C de-energized, 34GO-OPS-013-2, Normal Plant Shutdown, should NOT be entered.*

	SRO	• Determines that all electrical power is NOT available.
		• Directs the crew to confirm reactor power is between 40% and 50% RTP per 34GO-OPS-005-2, Power Changes.
		Contacts switchyard maintenance to assist in switchyard damage assessment.
		• Contacts Maintenance to inspect Independent Spent Fuel Storage Installation (ISFSI) for damage.
		• Within one hour, dispatches personnel to locally close or confirmed closed the following valves (if NOT performed by the BOP):
		  • 1P11-F167, CST Sump to Radwaste Drain.
		  • 1P11-F3002, Condensate Transfer Pumps and Sample Sink Drain Line to Yard.
		  • 2P11-F051, Retaining Wall Drain.
		  • 2P11-F100, Transfer Pump Wall Drain.
		• Dispatches personnel to inspect the plant for damage.
		• May request Chemistry to sample and analyze reactor coolant for indications of fuel failure.

Op-Test No.: **2019-301** **Scenario No.:** **12-1** **Event No.:** **7**

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
		NOTE: These actions are redundant to the SROs and either can perform.

	BOP	• Enters 34AB-Y22-002-0 and performs the following actions:
		• Determines that all electrical power is NOT available.
		• Informs SRO reactor power is between 40% and 50% RTP.
		• Contacts switchyard maintenance to assist in switchyard damage assessment.
		• Contacts Maintenance to inspect Independent Spent Fuel Storage Installation (ISFSI) for damage.
		• Within one hour, dispatches personnel to locally close or confirmed closed the following valves (if NOT performed by the SRO):
		  • 1P11-F167, CST Sump to Radwaste Drain.
		  • 1P11-F3002, Condensate Transfer Pumps and Sample Sink Drain Line to Yard.
		  • 2P11-F051, Retaining Wall Drain.
		  • 2P11-F100, Transfer Pump Wall Drain.
		• Dispatches personnel to inspect the plant for damage.
		• May request Chemistry (if NOT done by SRO) to sample and analyze reactor coolant for indications of fuel failure.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
		NOTE: *IAW 34GO-OPS-005-2, WHEN Feedwater flow is less than 7 mlbm/HR AND two Reactor Feed Pumps are running, one Reactor Feed Pump MAY be shut down.*
	BOP	As time allows, enters 34SO-N21-007-2, Condensate And Feedwater System, section 7.2.1 First Reactor Feed Pump Shutdown and Leaving in Standby. • Confirms Feedwater Flow is less than 7 Mlbm / hr. • Confirms RFPT 2A AND RFPT 2B are in Automatic control on 2C32-R600, Master Controller. • Places 2C32-R601A (2C32-R601B), RFP A (B) M/A Station, in Manual, by depressing the 'M' pushbutton until it illuminates, panel 2H11-P603. • Slowly decrease RFPT 2A (2B) speed with RFP A (B) M/A Station until the other RFP is controlling reactor vessel level. ***NOTE:*** *At this point the operator may stop here with the RFPT NOT injecting and continue with this section as time allows.*
		• When the other RFP has control of water level, slowly decrease RFPT 2A (2B) speed with RFP A (B) M/A Station until no speed decrease is observed AND/OR place the RFPT A (B) TMR switch to SS AND confirm Speed Setter yellow light illuminates. • Slowly lower RFPT 2A (2B) Speed Setter switch until RFPT speed is at 1000 rpm, at 2H11-P650. • IF desired, reduce the RFPT 2A (2B) speed to minimum AND allow the RFPT to “windmill”, provided seal water, steam seals, AND lube oil systems remain in service.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
		*Simulator Operator, after the RPI is EXITED and at Chief Examiners direction, ACTIVATE (**RB-7**)* *Torus leak at 0.75"/min* *svoT48140 (70/.75),* *svoT48142 (50/10),* *svoT48143 (50/10),* *svoT48147 (50/10),* *svoT48148 (50/100)* ***LOOK ahead,** this leak will be modified at 142 inches in the Torus by Event Trigger (**EGT48-1**).* *SIMULATOR OPERATOR: After one minute, **Notifies Unit 2 Control Room that you were in the Reactor Building and felt the floor vibrating.***
	ALL	The following annunciators are received: • 650-224, PANEL 2H11-P657 SYSTEM TROUBLE. • 657-086, TORUS S-W AREA INSTR SUMP LVL HIGH. • 657-087, TORUS N-W AREA INSTR SUMP LVL HIGH. • 657-088, TORUS N-E AREA INSTR SUMP LVL HIGH. • 657-089, TORUS S-E AREA INSTR SUMP LVL HIGH. • 657-104, TORUS S-W AREA INSTR SUMP LVL HIGH-HIGH. • 657-105, TORUS N-W AREA INSTR SUMP LVL HIGH-HIGH. • 657-106, TORUS N-E AREA INSTR SUMP LVL HIGH-HIGH. • 657-107, TORUS S-E AREA INSTR SUMP LVL HIGH-HIGH. • 657-013, TORUS N-E AREA INSTR SUMP LVL HIGH-HIGH-HIGH. • 657-031, TORUS S-E AREA INSTR SUMP LVL HIGH-HIGH-HIGH. • 657-049, TORUS N-W AREA INSTR SUMP LVL HIGH-HIGH-HIGH. • 657-067, TORUS S-W AREA INSTR SUMP LVL HIGH-HIGH-HIGH.
	BOP	• Reports multiple alarms to SRO indicating a break in the Reactor Building. • Directs SO/Maintenance to investigate the leak.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs BOP to 2H11-P657 panel. • When above alarms are reported, directs operator to monitor Torus water level and then if lowering, enter 34AB-T23-004-2, Torus Water Level.
		SIMULATOR OPERATOR: Four minutes after being dispatched to check for leaks in the Torus section of the Reactor Building ***AND ONLY AFTER*** *the crew has isolated 2E41-F051, report to the crew:* *A leak has been identified on HPCI line downstream of 2E41-F051 isolation valve AND if ASKED approximately 2 inches of water are on the Torus Area floor..*
	ALL	• TORUS WATER LEVEL HIGH/LOW, 602-235, annunciates • Recognizes that Torus level is decreasing.
	SRO	• Dispatches personnel to determine the location of the Torus leak. • If NOT already directed, directs NPO to enter 34AB-T23-004-2, Torus Water Level, and to monitor Torus water level. • Enters the PC EOP Flowchart when Torus level decreases to 146 inches. • May determine that water will NOT be added to the Torus until the cause of the low Torus level is identified and controlled. • Enter SC EOP flowchart for SC area water levels being high.
	BOP	• If NOT already performed, dispatches personnel to the Torus area AND the Reactor Building diagonals to determine the source of the water loss (if the leak location has NOT already been reported).

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
		NOTE: *Once the leak has been identified on the HPCI line, the operators may stop isolating other systems in an attempt to isolate the leak.*
	ATC	• Enters 34AB-T23-004-2, Torus Water Level, and performs the following: • Dispatches personnel to the Torus to determine source of leakage • Notifies SRO of ECCS TS requirements when closing valves. • Closes 2E21-F019B, Torus Suction Vlv. • Closes 2E11-F065B, Torus Suction Vlv. • Closes 2E11-F065D, Torus Suction Vlv.
		SIMULATOR OPERATOR: *Event Triggers **EGE41-12** will modify the Torus leak when 2E41-F051 valve switch is placed to close and will insert **EGE41-13**.*
	ATC	• Checks Torus water level and determines the Torus level is continuing to decrease with the above valves closed • Closes 2E41-F051, HPCI Torus Suction Vlv. (**Critical Task**) *Critical Task is met if 2E41-F051 is closed prior to opening at least 5 SRVs prior to Torus level reaching 98 inches (HCTL violation)*. • Opens 2E21-F019B, Torus Suction Vlv. • Opens 2E11-F065B, Torus Suction Vlv. • Opens 2E11-F065D, Torus Suction Vlv.
	ATC	• Enters 34AB-T23-001-2, Loss of Primary Containment Integrity, AND 34AB-T22-003-2, Secondary Containment Control. • Checks Torus water level and determines the Torus level has stopped decreasing • Notifies SRO that the Torus leak stopped after 2E41-F051 was closed.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7		Page 21 of 28
Event Description:	Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.	

Time	Position	Applicant's Actions or Behavior
		NOTE: *Once the leak has been identified on the HPCI line, the operators may stop isolating other systems in an attempt to isolate the leak.*
	ATC	IF this section is performed FIRST determines the Torus level is continuing to decrease, and performs the following valves: • Opens 2E51-F003, RCIC Torus Suction Vlv. • Closes 2E21-F019A, Torus Suction Vlv. • Closes 2E11-F065A, Torus Suction Vlv. • Closes 2E11-F065C, Torus Suction Vlv.
	ATC	• Checks Torus water level and determines the Torus level is continuing to decrease, and opens the following valves: • 2E51-F003, RCIC Torus Suction Vlv. • 2E21-F019A, Torus Suction Vlv. • 2E11-F065A, Torus Suction Vlv. • 2E11-F065C, Torus Suction Vlv.
	SRO	• IAW the PC flowchart, prior to water level reaching 98 inches, determines that the reactor is required to be shut down and enters the RC flowchart at point A. • Assigns the ATC to perform RC-1. • Assigns the BOP operator to perform RC-2 and RC-3. • Enters 31EO-EOP-010-2, RC EOP flow chart if RWL decreases below 3 inches. • Directs RWL Band of 3 to 50 inches.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
	ATC	• Performs RC-1 consisting of: • Inserts a manual scram. (**Critical Task**) *Critical Task is met if a manual scram is inserted prior to Torus level reaching 98 inches (HCTL violation)*. • Places the mode switch to SHUTDOWN. • Confirms all rods are inserted by observing full in lights, SPDS, or the RWM display. • Notifies SRO of rod position check. • Places SDV isolation valve switch to "isolate" & confirms closed. • If NOT tripped, places the Recirc pumps at minimum speed. • Inserts SRMs and IRMs. • Shifts recorders to read IRMS, when required. • Ranges IRMS to bring reading on scale. • Notifies the SRO when the above actions are complete.
		NOTE: *See **EVENT 8** for **RC-2** actions for RWL restoration.*
	BOP	• Performs RC-3 consisting of: • Monitor RPV pressure. • Confirm proper operation of pressure control system (TBV, LLS, etc.). • If necessary, allow RPV pressure to exceed 1074 psig then cycle any SRV to initiate LLS. • Maintain RPV pressure between 1074 and 800 psig. • Notify SRO of pressure control system operation.
	SRO	If the need to Emergency Depressurize is determined to be imminent, then Anticipates Emergency Depressurization. **(NOT EXPECTED TO PERFORM)** • Assign an operator to fully open all Main Turbine Bypass Valves. • Directs ATC/BOP to place HPCI in Pull To Lock prior to 110 inches Torus level.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 7

Event Description: Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98 inches in Torus.

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	• On the DEHC panel • Selects the Control > Bypass Valve screen. • Inserts a ramp rate of 100, then presses OK. • Inserts a bypass valve position of 100, then presses OK. • Checks that the Bypass Valve Jack status is active. • Recognizes that 3 Bypass Valves open. • Reports to the SRO 3 Bypass Valves are open. • May place HPCI Aux Oil pump in the Pull To Lock position on 2H11-P601 panel. (already isolated)
	ATC	• Provides periodic updates on Torus level to the SRO.
		Simulator Operator PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.:** 12-1	**Event No.:** 8	

Event Description: Loss of Condensate pumps and RFPTs. RCIC 2E51-F013 Failure to Auto Open requiring manual operation to inject prior to RWL reaching -180".

Time	Position	Applicant's Actions or Behavior
		SIMULATOR OPERATOR, after the reactor mode switch is placed in SHUTDOWN, Event Trigger ***EGC71-20*** *will insert the following malfunctions for a total loss of the Condensate & CRD Systems:* *+10 seconds mfN21_79A (Cond Pump 2A)* *mfN21_80A (Cond Booster Pump 2A)* *mfN21_87A (RFPT Pump 2A)* *mfC11_30A (CRD pump 2B)* *mfC11_30B (CRD Pump 2B)* *+5 seconds mfN21_79B (Cond Pump 2B)* *mfN21_80B (Cond Booster Pump 2B)* *mfN21_87B (RFPT Pump 2B)* *+5 seconds mfN21_79C (Cond Pump 2C)* *mfN21_80C (Cond Booster Pump 2C)*

5 Mins	BOP	• Performs RC-2 actions consisting of:
		  • Confirms proper Level Control response:
		    • Checks ECCS Injection Systems.
		    • Ensures FW Master Controller setpoint reduces to 9 inches and output reduces to 25% of previous value (will NOT due to low power).
		    • Set down does NOT auto function (low power), manually reduces FW Master Controller setpoint to approximately 9 inches.
		  • When feed flow is less than the capacity of the S/U level control valve (≈ 1.5 mlbm/hr), then:
		    • Confirms Open 2N21-F125.
		    • Confirms 2C32-R619, FW S/U level control valve controller, in Auto, set at approximately 9 inches.
		    • Closes 2N21-F110.
		    • Will transition to start RCIC to control RWL and with SRO permission will raise RWL to 32 to 42 inches.

Op-Test No.: 2019-301 **Scenario No.:** 12-1 **Event No.:** 8		Page 25 of 28
Event Description:	Loss of Condensate pumps and RFPTs. RCIC 2E51-F013 Failure to Auto Open requiring manual operation to inject prior to RWL reaching -180".	

Time	Position	Applicant's Actions or Behavior
		The malfunction for this event was in at the beginning of the scenario (rfE51_234 Final Value of BYPASS
	BOP	• Starts RCIC for level control by performing the following at 2H11-P602 panel: • Depresses RCIC Manual Initiation P/B • Confirms/Opens 2E51-F046 • Confirms/Starts Barom Cndsr Vac Pump • Confirms/Opens 2E51-F045 • Confirms/Opens 2E51-F019 • Confirms/Closes 2E51-F019 at flow > 79.3 gpm • Realizes 2E51-F013 did NOT auto open • Opens 2E51-F013 (**Critical Task**) *Critical Task is met if 2E51-F013 is manually open prior to RWL reaching -180 inches*. • Adjusts controller for desired flow and with SRO permission will raise RWL to 32 to 42 inches
		With Chief Examiners Permission the Scenario will be terminated when RWL is in band of 5 inches to 50 inches or approaching or if an Emergency Depressurization is performed when RPV pressure is within 50 psig of Torus pressure or as directed by the Chief Examiner.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-1** **Op-Test No.:** **2019-301**

Examiners: ____________ **Operators:** ____________ **SRO**

____________ ____________ **RO**

____________ ____________ **BOP**

Initiating Conditions:	Unit 2 is operating at 61% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Turnover	Continue startup and place RFPT 2A in service, starting at step 7.1.11.2.8 of 34SO-N21-007-2. Once RFPT 2A is in service, raise reactor power to 75% RTP using Recirc flow.

Summary:

- **Event 1:** Normal; RFPT 2A will be placed into service IAW 34SO-N21-007-2.
- **Event 2:** Instrument; A low suction pressure instrument failure resulting in CRD pump 2B tripping. The ATC will be required to manually start the standby CRD pump to restore system flow & pressure.
- **Event 3:** Component; The RFPT loop seal will experience a low-level condition causing condenser vacuum to degrade. The BOP operator will isolate the loop seal drain which stops condenser vacuum decreasing. Once the loop seal level is restored, the operator returns the loop seal system to normal lineup.
- **Event 4:** Component/TS; A HPCI steam line will break outside of Primary Containment. The outboard isolation valve is failed open and cannot be closed. Both isolation valves fail to automatically close on an automatic isolation signal and must be manually closed. (**Critical Task**) The SRO addresses Tech Specs for inoperable Primary Containment Isolation Valve & ECCS.
- **Event 5:** Component/TS; Recirc Pump 2B trips. The SRO addresses TS for an inoperable Recirc pump. The plant will be operating in the Region of Potential Instabilities of the Power-to-Flow map.
- **Event 6:** Reactivity; The ATC will insert Control rods to exit the Region of Potential Instabilities.
- **Event 7:** Major; Earthquake with a loss of SAT 2C requiring a reactor scram prior to 98” in Torus. (**Critical Task**) The crew will isolate 2E41-F051, HPCI Torus Suction Vlv. (**Critical Task**) prior to opening at least 5 SRVs before Torus level reaches 98 inches (HCTL violation).
- **Event 8:** Component; Loss of Condensate pumps and RFPTs. RCIC 2E51-F013 Failure to Auto Open requiring manual operation to inject prior to RWL reaching -180”. (**Critical Task**)

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-1** **Op-Test No.:** **2019-301**

Critical Tasks

- Manually isolate the HPCI isolation valves within 5 minutes of receiving 601-115 and 601-121. **(Event 4)**
- Insert a manual scram prior to Torus level reaching 98 inches (HCTL limit). **(Event 7)**
- 2E41-F051 is closed prior to opening at least 5 SRVs prior to Torus level reaching 98 inches (HCTL violation). (**Event 7**)
- RCIC 2E51-F013 Failure to Auto Open requiring manual operation to inject prior to RWL reaching -180". **(Event 8)**

	ES 301-4 Attributes	Required	Actual	Items
1.	Total Malfunctions	5-8	6	1. Low suction pressure CRD pump trip (**Event 2)** 2. RFPT Loop Seal failure (**Event 3)** 3. HPCI steam line break (**Event 4)** 4. Recirc Pump 2B trips (**Event 5)** 5. Earthquake (**Event 7)** 6. Condensate Pumps, RFPTs trip & 2E51-F013 failure (**Event 8)**
2.	Malfunctions After EOP Entry	1-2	1	1. Condensate Pumps, RFPTs trip & 2E51-F013 failure (**Event 8)**
3.	Abnormal Events	2-4	4	1. Low suction pressure CRD pump trip (**Event 2)** 2. HPCI steam line break (**Event 4)** 3. Recirc Pump 2B trips (**Event 5)** 4. Earthquake (**Event 7)**
4.	Major Transients	1-2	1	1. Scram prior to 98" in Torus (**Event 7)**
5.	EOPs entered, requiring substantive actions	1-2	2	1. RC-(Non-ATWS) **(Event 7)** 2. PC **(Event 7)**
6.	EOPs contingencies entered with substantive actions	0-2	0	1. NONE
7.	Preidentified Critical Tasks	≥ 2	4	1. HPCI steam line break (**Event 4)** 2. Earthquake (**Event 7)** 3. Closing 2E41-F051 prior to 98 inches (**Event 7**) 4. Condensate Pumps, RFPTs trip & 2E51-F013 failure (**Event 8)**

ILT 12 NRC DRAFT Scenario 1

SHIFT TURNOVER

target ZERO Every day, every job, safely.	**Safety Focus**
UNIT 1 STATUS	
Plant Conditions:	• Unit 1 is operating at 100% RTP.
Plant Conditions:	• Unit 2 is operating at 61% RTP. • 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Protected Train: ☒ Division I ☐ Division II	**EOOS:** ☒ Green ☐ Orange ☐ Yellow ☐ Red
Scheduled evolutions:	☐ Continue startup and place RFPT 2A in service, starting at step 7.1.11.2.8 of 34SO-N21-007-2. ☐ Once RFPT 2A is in service, raise reactor power to 75% RTP using Recirc flow.
Surveillances due this shift:	☐ NONE
Inop Equipment:	☐ 2D11-K615B, Off gas Post Treatment Radiation monitor has failed Downscale. IAW TS/TRM, I&C has placed 2D11-K615B in the trip condition while maintaining the function of 602-405, Post Treatment O/G Radiation Hi-Hi-Hi/Inop. A Caution Tag is attached to 2D11-K615B switch.
Active tagouts:	☐ NONE
Rod Configuration:	☐ See RWM Step 25

NRC DRAFT

Facility: E. I Hatch **Scenario No.:** 12-2 **Op-Test No.:** 2019-301

Examiners: ________ **Operators:** ________ SRO

________ ________ RO

________ ________ BOP

Initial Conditions. Unit 2 is operating at 85% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.

Turnover: Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1. After surveillance is complete, raise reactor power to 100% RTP using Recirc flow.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.
2	mfD11_190	C (BOP)	Leak in RBCCW System. Isolate RWCU.
3	mfP41_292 mfP41_67B loP41-C001BA3 loP42-C001BG1 loP42-C001BR2	C (ATC) TS (SRO)	PSW Pump 2B sheared shaft, Standby PSW pump 2D fails to auto start and must be manually started.
4	mfN21_5A	C (BOP)	RFPT 2A experiences high vibration requiring the BOP to manually trip RFPT 2A.
5	N/A	R (ATC)	ATC insert control rods to exit the Region Of Potential Instabilities of the Power to Flow map.
6	mfE51_114 diE51A-S17	C (ATC) TS (SRO)	RCIC Inadvertent starts with Trip pushbutton failure.
7	mfE51_250 svoE51074 svoE51075 diT41-B009 diT41-B026	M (ALL)	Unisolable leak in Reactor Building (RCIC) requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)
8	mfE41_106	C (BOP)	HPCI flow controller output fails low requiring manual increase to obtain injection.
9	N/A	M (ALL)	Emergency Depress when Max Safe exceeded in more than one area. (**Critical Task**)
*	(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor		

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 1

Event Description: Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.

Time	Position	Applicant's Actions or Behavior
10 Min.	SRO	Directs BOP to perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.

	BOP	IAW 34SV-C71-004-2, performs the following:
		• On panel 2H11-P603, depresses 2C71-S3A, Manual Reactor Scram Channel A1 pushbutton,
		• Confirms the following:
		  • 2C71-S3A, Manual Reactor Scram Channel A1 pushbutton, light ILLUMINATES.
		  • Annunciator 603-117, REACTOR AUTO SCRAM SYSTEM A TRIP, ALARMS
		  • Annunciator 603-126, REACTOR MANUAL SCRAM SYSTEM A TRIP, ALARMS.
		  • Scram Group A Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, EXTINGUISH.

	BOP	• Resets Manual RPS Trip System A1, using 2C71-S5, Reactor Scram Reset switch.
		• Confirms AND independently verify the following:
		  • 2C71-S3A, Manual Reactor Scram Channel A1 pushbutton, light EXTINGUISHES.
		  • Annunciator 603-117, REACTOR AUTO SCRAM SYSTEM A TRIP, CLEARS
		  • Annunciator 603-126, REACTOR MANUAL SCRAM SYSTEM A TRIP, CLEARS.
		  • Scram Group A Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, ILLUMINATE.
		• Obtains a computer printout of control rod position Rod Pattern Log (OD7).
		• Confirms AND independently verifies that these control rod positions exactly match the positions obtained in step 7.1.4 (Prerequisites).

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 1

Event Description: Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.

Time	Position	Applicant's Actions or Behavior

	BOP	IAW 34SV-C71-004-2, performs the following:
		• On panel 2H11-P603, depresses 2C71-S3C, Manual Reactor Scram Channel A2 pushbutton,
		• Confirms the following:
		  • 2C71-S3C, Manual Reactor Scram Channel A1 pushbutton, light ILLUMINATES.
		  • Annunciator 603-117, REACTOR AUTO SCRAM SYSTEM A TRIP, ALARMS
		  • Annunciator 603-126, REACTOR MANUAL SCRAM SYSTEM A TRIP, ALARMS.
		  • Scram Group A Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, EXTINGUISH.

	BOP	• Resets Manual RPS Trip System A2, using 2C71-S5, Reactor Scram Reset switch.
		• Confirms AND independently verify the following:
		  • 2C71-S3C, Manual Reactor Scram Channel A2 pushbutton, light EXTINGUISHES.
		  • Annunciator 603-117, REACTOR AUTO SCRAM SYSTEM A TRIP, CLEARS
		  • Annunciator 603-126, REACTOR MANUAL SCRAM SYSTEM A TRIP, CLEARS.
		  • Scram Group A Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, ILLUMINATE.
		• Obtains a computer printout of control rod position Rod Pattern Log (OD7).
		• Confirms AND independently verifies that these control rod positions exactly match the positions obtained in step 7.1.4 (Prerequisites).

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 1

Event Description: Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.

Time	Position	Applicant's Actions or Behavior

	BOP	IAW 34SV-C71-004-2, performs the following:
		• On panel 2H11-P603, depresses 2C71-S3B, Manual Reactor Scram Channel B1 pushbutton,
		• Confirms the following:
		  • 2C71-S3B, Manual Reactor Scram Channel B1 pushbutton, light ILLUMINATES.
		  • Annunciator 603-118, REACTOR AUTO SCRAM SYSTEM B TRIP, ALARMS
		  • Annunciator 603-127 REACTOR MANUAL SCRAM SYSTEM B TRIP, ALARMS.
		  • Scram Group B Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, EXTINGUISH.

	BOP	• Resets Manual RPS Trip System B1, using 2C71-S5, Reactor Scram Reset switch.
		• Confirms AND independently verify the following:
		  • 2C71-S3B, Manual Reactor Scram Channel B1 pushbutton, light EXTINGUISHES.
		  • Annunciator 603-118, REACTOR AUTO SCRAM SYSTEM B TRIP, CLEARS
		  • Annunciator 603-127, REACTOR MANUAL SCRAM SYSTEM B TRIP, CLEARS.
		  • Scram Group B Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, ILLUMINATE.
		• Obtains a computer printout of control rod position Rod Pattern Log (OD7).
		• Confirms AND independently verifies that these control rod positions exactly match the positions obtained in step 7.1.4 (Prerequisites).

Op-Test No.: 2019-301 Scenario No.: 12-2 Event No.: 1		Page 5 of 27
Event Description:	Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.	

Time	Position	Applicant's Actions or Behavior

	BOP	IAW 34SV-C71-004-2, performs the following:
		• On panel 2H11-P603, depresses 2C71-S3D, Manual Reactor Scram Channel B2 pushbutton,
		• Confirms the following:
		  • 2C71-S3B, Manual Reactor Scram Channel B2 pushbutton, light ILLUMINATES.
		  • Annunciator 603-118, REACTOR AUTO SCRAM SYSTEM B TRIP, ALARMS
		  • Annunciator 603-127 REACTOR MANUAL SCRAM SYSTEM B TRIP, ALARMS.
		  • Scram Group B Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, EXTINGUISH.

	BOP	• Resets Manual RPS Trip System B2, using 2C71-S5, Reactor Scram Reset switch.
		• Confirms AND independently verify the following:
		  • 2C71-S3B, Manual Reactor Scram Channel B2 pushbutton, light EXTINGUISHES.
		  • Annunciator 603-118, REACTOR AUTO SCRAM SYSTEM B TRIP, CLEARS
		  • Annunciator 603-127, REACTOR MANUAL SCRAM SYSTEM B TRIP, CLEARS.
		  • Scram Group B Solenoid lights 1, 2, 3, AND 4, panel 2H11-P603, ILLUMINATE.
		• Obtains a computer printout of control rod position Rod Pattern Log (OD7).
		• Confirms AND independently verifies that these control rod positions exactly match the positions obtained in step 7.1.4 (Prerequisites).

	BOP	• Notifies the SRO that 34SV-C71-004-2, Reactor Manual Scram Functional Test is complete.
		SIMULATOR OPERATOR enters the next event after surveillance is complete OR at the Chief Examiner's request.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 2

Event Description: Leak in RBCCW System. Isolate RWCU.

Time	Position	Applicant's Actions or Behavior
8 Min		*Simulator Operator, at the Chief Examiner's direction, ENTER (**RB-2**)* • *mfD11_190, High Radiation in RBCCW f:5 r:10.*
	ALL	Recognize and respond to the following alarms: • RBCCW RADIATION HIGH, (601-413) • RBCCW SURGE TK LEVEL, (650-258)

	BOP	Enters the APR 34AR-650-258-2:
		• Dispatches a SO to perform the following:
		  • At 2P42-A001, RBCCW Surge Tank, confirm the level is greater than 30 inches above the tank centerline
		  • Confirm CLOSED 2P42-F055, Level Control Valve Bypass
		• IF annunciator RBCCW RADIATION HIGH (601-413) is ALARMING, enters 34AR-601-413-2
		• IF 2P42-F054, Level Control Valve, is malfunctioning, CLOSE 2P42-F027, Level Control Valve Isolation, AND control level using 2P42-F055.
		• IF level continues to increase, PLACE the standby RBCCW Heat Exchanger in service per 34SO-P42-001-2, RBCCW System, AND ISOLATE service water to the original in-service heat exchanger by closing the applicable 2P41-F439A or 2P41-F439B
		• IF level increase is due to system in leakage, notify chemistry AND ensure compliance with 64CH-OPS-010, THEN throttle OPEN 2P42-F032, RBCCW Surge Tank Drain Valve, as needed to lower surge tank level.

	BOP	Enters the ARP 34AR-601-413-2: • Confirms high radiation levels on 2D11-R604, RBCCW/PSW Rad Monitor, panel 2H11-P600 • Requests Chemistry to sample RBCCW • Monitor 2P42-A001, RBCCW Surge Tank, level locally • IF possible, isolate radioactive RBCCW loads one at a time to determine the source of in leakage.

Op-Test No.: 2019-301	Scenario No.: 12-2	Event No.: 2	Page 7 of 27
Event Description:	Leak in RBCCW System. Isolate RWCU.		

Time	Position	Applicant's Actions or Behavior
		SIMULATOR OPERATOR, At Chief Examiner permission, REPORT as Chemistry: "The sample of RBCCW indicates higher than normal levels of radiation."
		NOTE: *The Reactor water sample point remains in service it the switch on the P602 panel remains in the REACTOR WATER position.*
	SRO	• Directs the ATC to isolate RWCU IAW 34SO-G31-003-2 • May address with RWCU out of service, TSR 3.4.1.1 for continuous monitoring of Rx coolant conductivity (TRACKING RAS with switch on P602 in the REACTOR WATER position)
		NOTE: *When RWCU is isolated, RBCCW radiation levels will slowly decrease.*
	BOP	Isolates RWCU IAW 34SO-G31-003-2: • Secures the running RWCU pump • Closes 2G31-F001 on panel 2H11-P602 • Closes 2G31-F004 on panel 2H11-P601 Enters 34AB-G31-001-2, RWCU System Isolation
		Simulator Operator, at the Chief Examiner's direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.: 12-2** **Event No.: 3**	Page 8 of 27
Event Description:	PSW Pump 2B shaft shears, PSW pump 2D fails to auto start and must be manually started.	

Time	Position	Applicant's Actions or Behavior
8 Min		*At the Chief Examiner's direction, Simulator operator, INSTRUCT the BOP operator by phone to stay on the line until told to hang up. THEN ENTER:* ***(RB-3)*** • *mfP41_292* • *mfP41_67B,* • *loP41_C001BR2 (ON),* • *loP41_C001BG1 (OFF),* • *loP41_C001BA3 (OFF)* • *mf65013433 (OFF)* • *mf65023482 (OFF)*
	ATC	• When PSW pump 2B is tripped, responds to PSW PUMPS DISCH PRESS LOW, (650-239) alarm.
	ATC	• Acknowledges the alarms and informs the SRO that the PSW system pressure is low and that the PSW 2D pump did NOT auto start. (PSW pump 2D may be started manually prior to recognizing failure to auto start. There is NOT an obvious reason for the pressure being low.
	ATC	• Manually starts the PSW pump 2D IAW 34AR-650-156-2 or 34AB-P42-001-2, Loss of PSW. (*May NOT pull procedures until after the pump has been started.)* • Monitors for increasing system pressure (>90psig). • Dispatches SO/Maintenance to investigate the cause of the PSW Low system pressure.

Op-Test No.: 2019-301 Scenario No.: 12-2 Event No.: 3		Page 9 of 27
Event Description:	PSW Pump 2B shaft shears, PSW pump 2D fails to auto start and must be manually started.	

Time	Position	Applicant's Actions or Behavior
		SIMULATOR OPERATOR: *ENSURE PSW TRIGGER* ***EGP41-1*** *is ACTIVATED, THEN* *After 3 minutes of being sent to investigate the PSW system low pressure AND after the ATC has started PSW pump 2D, report that the PSW pump 2B motor is running, but the pump shaft is NOT turning.*
	SRO	• Confirms/sends SO/Maintenance to investigate PSW Low system pressure. • Directs the operator to place the PSW Pump 2B to PTL off. • Reviews TS 3.7.2, Plant Service Water (PSW) System and Ultimate Heat Sink (UHS), Condition A.1 and determines PSW Pump2B must be restored to OPERABLE status within 30 days.
	ATC	• Places 2P41-C001B control switch to PTL OFF position and reports this to the SRO.
		SIMULATOR OPERATOR, PROCEEDS to the next event at the Chief Examiner's direction.

Op-Test No.: 2019-301	**Scenario No.: 12-2** **Event No.: 4**	Page 10 of 27
Event Description:	RFPT 2A experiences high vibration requiring the BOP to manually trip RFPT 2A.	

Time	Position	Applicant's Actions or Behavior
5 Min.		*SIMULATOR OPERATOR: At the direction of the Chief Examiner, ACTIVATE mfN21_5A (**RB-4**) RFPT 2A VIBRATION.*
	BOP	Receives annunciator, RFPT 2A EXCESSIVE VIBRATION, (650-331).
	BOP	Responds to annunciator, RFPT 2A EXCESSIVE VIBRATION, (650-331) and enters the ARP: • Confirms the vibration by observing Mark VI 2N32-K4001A/2N32-K4001B, on panel 2H11-P650, at screen **Monitor** → **RFPT Vibration** • Confirms oil temperature is being maintained at 120°F to 130°F on 2P41-R602, Oil Temp controller, 2H11-P650. • Adjusts the bias on RFP 2A using 2C32-R601A, RFP 2A M/A Station Controller, to place RFP 2A in the lead. • Notifies SRO the need to reduce power per 34GO-OPS-005-2 OR increase or decrease RFPT speed to exit the critical speed range of 4000 to 4800 RPM. • Contacts System Engineer for further instructions. • IF the RFPT vibration exceeds 5.5 mils, Shutdowns RFPT 2A per 34SO-N21-007-2. • When RFPT 2A vibration INCREASES to 6.0 mils, trips RFPT 2A. • Dispatches a SO to report local vibration on 2H21-P536, TMR Workstation Mark V Control Panel.
		SIMULATOR OPERATOR: When contacted by the BOP, as the System Engineer, tell the operator you will look into the RFPT vibration and get back to the operator.

Op-Test No.: 2019-301 Scenario No.: 12-2 Event No.: 4	Page 11 of 27
Event Description: RFPT 2A experiences high vibration requiring the BOP to manually trip RFPT 2A.	

Time	Position	Applicant's Actions or Behavior
		SIMULATOR OPERATOR: After RFPT 2A is tripped, ENSURE Event Trigger When contacted by the BOP, as the System Engineer, tell the operator you will look into the RFPT vibration and get back to the operator.
	BOP	With RFPT vibration > 6.0 mils, performs one of the following: (**either is acceptable**) • Trips RFPT 2A and receives #2 Speed Limiter Runback. OR • Reduces power in an attempt to lessen the plant transient and then trips RFPT 2A.
	SRO	With RFPT vibration > 6.0 mils, directs one of the following: (**either is acceptable**) Directs BOP to trip RFPT 2A and verifies #2 Speed Limiter Runback occurs OR • Directs operator to reduce power in an attempt to lessen plant transient and then trip the RFPT 2A.
		SIMULATOR OPERATOR; PROCEEDS to the next Event after Chief Examiner approval.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 5

Event Description: Insert control rods to exit the Region Of Potential Instabilities of the Power to Flow map.

Time	Position	Applicant's Actions or Behavior
5 Mins	ATC	• Determines that the plant is in the Region Of Potential Instabilities of the Power to Flow map.
		NOTE: *IF the crew makes the decision to SCRAM the Reactor, at the Chief Examiners direction, PROCEED to the MAJOR EVENT.*
		EXAMINER NOTE: *Log time when Region of Potential Instabilities has been ENTERED.* ***Time:*** _________
		NOTE*: IAW 34GO-OPS-005-2, Power Changes, Limitation 5.2.3.1:* *If the 'Region Of Potential Instabilities' (RPI) is entered, IMMEDIATELY initiate actions to exit the (RPI), to return operation to the Analyzed Region of the Power/Flow Map outside of the RPI.* *If the Immediate Exit Region is entered, within 5 minutes the operators are to initiate control rod movement to return to the Analyzed Region.* *Operation within the Analyzed Region AND outside of the RPI must be restored within 1 hour.*
	SRO	• Directs ATC operator to insert rods to exit the RPI and Immediate Exit Region to return operation to the Analyzed Region of the Power/Flow Map.
		NOTE: *RBM Downscale alarm may alarm during this movement due to the significant rod worth of these rods. The RBM Downscale and Rod Out Block alarms may be flagged.*

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 5

Event Description: Insert control rods to exit the Region Of Potential Instabilities of the Power to Flow map.

Time	Position	Applicant's Actions or Behavior

	ATC	• Inserts control rods per 34GO-OPS-065-0, Control Rod Movement:
		  • Inserts control rods per the Reactivity Briefing Sheet and rod pull sheets.
		  • Selects first Rod to be inserted Group 25 34-11.
		  • Places Control Rod movement switch to the IN position.
		  • Verifies Rod moves using Rod display information and Rx and Generator power decreasing.
		  • Releases Rod movement switch so that the control rod stops 1 position before the insert limit, unless the insert limit is 00.
		  • Initials Rod movement Sheet.
		  • Verifier, if available, Initials Rod movement sheet.
		  • Notifies the SRO when they are out of the RPI.
		• If required, adjust 2C11-F003 to get 220 – 280 psid drive water dp

		EXAMINER NOTE: *Log time when Region of Potential Instabilities has been EXITED.* ***Time:*** ________
		SIMULATOR OPERATOR; PROCEEDS to the next Event after Chief Examiner approval.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 6		
Event Description: RCIC Inadvertent starts with Trip pushbutton failure.		

Time	Position	Applicant's Actions or Behavior
6 Mins		*At the Chief Examiner's direction, Simulator Operator;* *Contact ATC and request EDG 1A Main Fuel Oil Storage tank level,* *ACTIVATE: (**RB-6**) to ENTERS mfE51_114 and diE51A-S17 to "OFF".*
	ALL	• Recognizes that RCIC has started. • Receives SEC SYSTEM AUTO INITIATION SIGNAL PRESENT, (650-234), is received.
	ATC	• Determines RCIC has auto started and that RWL is normal.
	SRO	• May tell ATC that RWL is normal. • Directs operator to trip RCIC.

	ATC	• Attempts to Trip RCIC by depressing the RCIC Trip pushbutton and recognizes that the Trip pushbutton is failed.
		• Notifies the SRO that the RCIC trip pushbutton has failed and Trips RCIC by ONE of the following methods:
		  • Closes the Trip and Throttle valve, 2E51-F524.
		  OR
		  • Places controller 2E51-R612 to Manual and reduces output to lower RCIC discharge pressure to below RPV pressure.
		  • Receives RCIC TURBINE BRG OIL PRESS LOW, (602-304) & RCIC PUMP DISCHARGE FLOW LOW, (602-322).

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 6		Page 15 of 27
Event Description: RCIC Inadvertent starts with Trip pushbutton failure.		

Time	Position	Applicant's Actions or Behavior
	ATC	• Enters 34AB-E10-001-2, Inadvertent Initiation of ECCS/RCIC. • Enters 34SO-E51-001-2, RCIC System. • Dispatches RO/Maintenance to determine cause of initiation signal and the cause of the Trip pushbutton failure. • May attempt to RESET the Initiation signal. • Will close 2E51-F524, Trip and Throttle Vlv, if NOT already closed. • Notifies SRO that RCIC is shutdown.
	SRO	• May direct the operator run the Trip and Throttle Valve down to in case RCIC is needed later. • Enters TS RAS for RCIC 3.5.3 Condition A, which requires verifying HPCI is operable within 1 hour and restoring RCIC in 14 days.
		NOTE: *It is intended that RCIC is left in its' current condition and NOT returned to standby.*
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 7

Event Description: Unisolable RCIC Steam leak in Reactor Building requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
15 Min		*At the Chief Examiner's direction, SIMULATOR OPERATOR, ENTER (**RB-7**) mfE51_250, RCIC Steam Line, break 70/3.5, diT41-B009 & diT41-B026 to OFF.* ***NOTE:*** *SVOs svoE51074 (2E51-F007 Stuck Open) and svoE51075 (2E51-F008 Stuck Open), are activated at the beginning.* ***NOTE:*** *It takes approximately 3 minutes for the first alarm, LEAK DET DIFF TEMP HIGH, (601-321), to alarm.*

	ALL	• Receives the following:
		  • LEAK DET DIFF TEMP HIGH, (601-321) in 3 minutes.
		  • RCIC ISOL TIMER INITIATED, (602-303) in 3.5 minutes.
		  • LEAK DET AMBIENT TEMP HIGH, (601-327) in 4 minutes.
		  • RCIC ISOLATION SIGNAL LOGIC A INITIATED, (602-307) after timer times out.
		  • RCIC ISOLATION SIGNAL LOGIC B INITIATED, (602-313) after timer times out.

	SRO	• Orders BOP to evaluate leak detection alarms on 2H11-P601. • Orders RCIC to be isolated. • Orders BOP to evacuate the Reactor Building. • May notify Maintenance for assistance in closing RCIC valves if ATC/BOP does NOT.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 7		Page 17 of 27
Event Description:	Unisolable RCIC Steam leak in Reactor Building requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	• Responds to RCIC alarms. • Observes RCIC Isolation valves have failed to close. • Places 2E51-F007, RCIC Isolation valve switch to Close. • Places 2E51-F008, RCIC Isolation valve switch to Close. • Notifies SRO of RCIC valve failures. • May notify Maintenance for assistance in closing RCIC valves if SRO does NOT.

	BOP	• Respond to annunciator LEAK DET DIFF TEMP HIGH, (601-321).
		• Addresses 2G31-R604 OR 2G31-R608 on 2H11-P614.
		• Identifies the following points on R604 increasing:
		  • 113, TORUS NW WALL is ~ 112°F.
		  • 114, TORUS SE WALL is ~ 97°F.
		  • 115, TORUS VENT AIR DIFF is ~ 31°F.
		  • 116, TORUS VENT AIR DIFF is ~ 18°F.
		
		• Identifies the following points on R608 increasing:
		  • 115, TORUS WEST WALL is ~ 112°F.
		  • 116, TORUS NE WALL is ~ 98°F.
		  • 117, TORUS VENT AIR DIFF is ~ 31°F.
		  • 118, TORUS VENT AIR DIFF is ~ 18°F.
		  • 119, MAIN STEAM TNL ~ 140°F.
		
		• Reports temperatures to the SRO.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 7

Event Description: Unsolable RCIC Steam leak in Reactor Building requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior

	SRO	• Enters the SC flow chart.
		• Progresses down each path.
		• Proceeds down the SC/T path, directing:
		  • All available area coolers are operated.
		  • Operate the Refueling Floor ventilation.
		  • Operate the Reactor Building ventilation.
		  • Isolate all systems discharging into the area except those needed for ACC, shutdown the reactor, suppress a fire, maintain primary containment.

	SRO	• Orders the reactor shutdown before any area exceeds Max Safe operating temperatures or delta temps since a primary system (RCIC) is discharging into Secondary Containment. (*May direct this prior to Max Safe received*).
	SRO	• Assigns the ATC to perform RC-1. • Assigns the BOP operator to perform RC-2 and RC-3. • Enters 31EO-EOP-010-2, RC EOP flow chart if RWL decreases below 3 inches or if any area exceeds Max Safe. • Directs RWL band of 3 to 50 inches.

Op-Test No.: 2019-301	**Scenario No.: 12-2 Event No.: 7**	Page 19 of 27
Event Description:	Unisolable RCIC Steam leak in Reactor Building requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior

	ATC	• Performs RC-1 consisting of:
		  • Inserts a manual scram. ***Critical Task***
		  (***Critical Task*** *is met when a manual scram is inserted prior to exceeding a Max Safe Operating temperature. Approximately 8 minutes to exceed Mas Safe*).
		  • Places the mode switch to SHUTDOWN.
		  • Confirms all rods are inserted by observing full in lights, SPDS, or the RWM display.
		  • Notifies SRO of rod position check.
		  • Places SDV isolation valve switch to "isolate" & confirms closed.
		  • If NOT tripped, places the Recirc pumps at minimum speed.
		  • Inserts SRMs and IRMs.
		  • Shifts recorders to read IRMS, when required.
		  • Ranges IRMS to bring reading on scale.
		  • Notifies the SRO when the above actions are complete.
		
		NOTE: *SIMULATOR OPERATOR, AFTER the crew scrams the reactor, ENSURE Event Trigger* ***EGC71-18*** *modifies mfE51_250 Ramp rate to 7.0 with a Final of 100 & deletes overrides for MSIVs.*

	BOP	• Performs RC-2 actions consisting of:
		  • Confirms proper Level Control response:
		    • Checks ECCS Injection Systems (will NOT be in service if RWL >-35 inches).
		    • Ensures FW Master Controller setpoint reduces to 9 inches and output reduces to 25% of previous value.
		    • If Set down does NOT auto function, manually reduces FW Master Controller setpoint to approximately 9 inches.
		  • When feed flow is less than the capacity of the S/U level control valve (≈ 1.5 mlbm/hr), then:
		    • Confirms/Opens 2N21-F125.
		    • Confirms/places 2C32-R619, FW S/U level control valve controller, in Auto, set at approximately 9 inches.
		    • Closes 2N21-F110.
		  • If RFPTs are no longer available, will transition to HPCI to control RWL. ***(SEE EVENT #8 FOR HPCI)***

Op-Test No.: 2019-301	**Scenario No.:** 12-2	**Event No.:** 7	Page 20 of 27
Event Description:	Unisolable RCIC Steam leak in Reactor Building requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)		

Time	Position	Applicant's Actions or Behavior

	BOP	• Performs RC-3 consisting of:
		  • Monitoring RPV pressure.
		  • Confirms proper operation of pressure control system (TBV, LLS, etc.), at 2H11-P650 panel, by confirming TBVs are responding to control reactor pressure at the desired pressure setpoint.
		  • Maintains RPV pressure between 1074 and 800 psig until a different band is directed.
		  • Notifies SRO of pressure control system operation.
		
		  • If the MSIVs are closed, then the operator will perform the following:
		    • Confirms closed Inboard MSIVs (2B21-F022A-D) and places control switches to close.
		    • Confirms closed Outboard MSIVs (2B21-F028A-D) and places control switches to close.
		    • If directed to lower the driving head of the leak, opens SRVs to maintain RPV pressure in band.
		
		  • If the MSIVs are still open, SRO orders "Anticipate Emergency Depress," then the operator will perform the following:
		    • At P650 HMI screen,
		      • Selects "Control".
		      • Selects "Bypass Valve".
		      • Inserts "Ramp Rate" of 100 then OK.
		      • Inserts BPV position of 100 then OK.
		      • Ensures Bypass Valve Jack Status is Active (controlling)
		      • Notifies SRO that Bypass Valves are opening.

	SRO	• May order a lower Reactor pressure band to reduce the driving head IAW RC/P Path of the RC (Non-ATWS) flowchart. • May direct an operator to perform Rx Power, Level, and Pressure control, so that the other operator can address Secondary Containment parameters.
		Simulator operator PROCEEDS to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-2 Event No.: 8		Page 21 of 27
Event Description:	HPCI flow controller output fails low requiring manual increase to obtain injection. (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior
5 Min		*SIMULATOR OPERATOR; ENSURE Event Trigger* ***EGE41-1*** *ACTIVATES malfunction mfE41_106, HPCI Flow Controller Fails Low, with HPCI speed >3800 rpm.*

	BOP	• If necessary, starts HPCI for level control by performing the following at 2H11-P602 panel:
		  • If required, depresses High Water Level Reset P/B.
		  • Opens 2E41-F059, Lube Oil Cooling Wtr Vlv
		  • Starts 2E41-C002-2, Barometric Condenser Vacuum Pump
		  • Opens 2E41-F001, Turbine Steam Supply Vlv
		  • Starts 2E41-C002-3, Aux Oil Pump
		  • Opens 2E41-F006, Pump Discharge Valve
		  • Confirms TCV.
		  and
		  • Confirms/Closes 2E41-F012 at flow > 790 gpm.
		  • Adjusts controller for desired flow and with SRO permission will raise RWL to 32 to 42 inches.

		NOTE TO EXAMINER: *Prolonged operation with HPCI <2000 RPMs is to be avoided.*

	BOP	• Confirms the following valves OPENED:
		  • Turbine Control Vlv
		  • Turbine Stop Vlv
		• Confirms the Turbine does NOT come up to proper speed.
		• Recognizes that HPCI flow controller has failed and places 2E41-R612, Flow Controller, in MANUAL and adjusts output to maintain RWL
		• When flow increases to 790 GPM, confirms 2E41-F012, Min Flow Vlv, closed.

		Simulator operator PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 9

Event Description: Emergency Depress when Max Safe exceeded in more than one area. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
	ATC	• Provides periodic updates on temperature readings and delta temp readings to the SRO. • Reports R604 points 115 is above Max Safe. • Reports R608 points 117 & 120 are above Max Safe. • When a second temperature or delta temp exceeds Max Safe levels, informs the SRO.
	SRO	• May order a lower Reactor pressure band to reduce the driving head. • Transitions to CP-1 and orders 7 ADS valves open for Emergency Depress.
	ATC	• Provides periodic updates on temperature readings and delta temp readings to the SRO. • When a second temperature or delta temp exceeds max safe levels, informs the SRO.
	SRO	• Transitions to CP-1 and orders 7 ADS valves open for emergency depress.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 9

Event Description: Emergency Depress when Max Safe exceeded in more than one area. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	• Places the switches for 7 ADS valves in the open position. ***Critical Task:*** (***Critical Task*** *is met when at least 5 SRVs have been opened WITHIN 10 minutes of exceeding Max Safe Operating temperatures in more than one area. Max Safe Operating temperature is exceeded in approximately 18 minutes*). • The amber lights for the SRVs will NOT illuminate if pressure has been reduced to below approximately 300 psig. In this case the operator must use 2H11-P614 recorder indication to monitor tail pipe temperatures for the SRVs to verify the valves opened (Recorder 2B21-R614). • Depending on Reactor Water Level prior to opening ADS valves, RWL may swell to above 60 inches, requiring the operator to enter 34AB-C32-001-2, Reactor Water Level Above 60 inches. • Operator secures all injection other than CRD.
	SRO	• Enters Primary Containment Control (PC) EOP flow chart. • IAW PC/T path directs Torus Cooling to be placed into service. If Torus temperature is <100°F only one loop of RHR will be placed in Torus Cooling. If Torus temperature is >100°F both loops of RHR will be placed in Torus Cooling.
		NOTE: *The operator may place torus cooling in service by using the Placard that's available or using the appropriate section of the procedure. These steps assume the Placard is used. The A and/or B loop of RHR may be used depending on Torus temperature. The following steps are written assuming "B" loop and "B" pump is used. If/When "A" loop is used, substitute "A" for "B" for valves and if "B" pump is NOT used substitute "A", "C", or "D" for "B" pump.*
	ATC	Enters 34SO-E11-010-2, Residual Heat Removal, AND places RHRSW in service IAW Placard; • Overrides 2E11-F068B Low Discharge Pressure Interlock. • Positions 2E11-F068B to 45% OPEN. • Starts RHRSW pump B. • Places 2E11-F068B Low Discharge Pressure Interlock switch to normal position. • Positions 2E11-F068B to obtain < 4400 gpm AND < 450 psig.

Op-Test No.: 2019-301 **Scenario No.:** 12-2 **Event No.:** 9		
Event Description:	Emergency Depress when Max Safe exceeded in more than one area. (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior
	ATC	• IF desired to start a SECOND RHRSW pump, • Throttles 2E11-F068B to achieve max flow rate (NOT to exceed 4400 GPM). • Opens 2E11-F068B an additional 5%. • Starts second RHRSW Pump. • Positions 2E11-F068B to obtain < 8800 gpm AND < 450 psig.
	ATC	IAW 34SO-E11-010-2, Placard; • IF RWL <2/3 core height, (-193 inches), PLACE the Cnmt Spray Vlv Cntl 2/3 Core Ht Permis keylock in the MANUAL OVERRD. (NOT needed) • IF required by EOPs AND LOCA signal present, PLACE Cnmt Spray Vlv Cntl switch in the MANUAL position. (NOT needed) • Opens 2E11-F048A (2E11-F048B). • IF SPC is NOT required per the EOPs, CLOSE 2E11-F047A (2E11-F047B). (NOT needed) • opens 2E11-F003A (2E11-F003B). • IF power is being provided by EDG, CHECK EDG loading prior to start of RHR pump(s).
	ATC	• Starts RHR Loop A(B) pump(s). • Opens 2E11-F028A (2E11-F028B. • Throttles Open 2E11-F024A (2E11-F024B). • Open 2E11-F047A (2E11-F047B). • IF it is desired to provide cooling of the Torus rather than mixing, ensure RHR flow is < 11,500 GPM, then closes 2E11-F048A (2E11-F048B). • Throttles 2E11-F068A OR 2E11-F068B to maintain ≥ 20 PSID Hx A(B) dp. • Refers to 34SO-E11-010-2.
		The scenario will be terminated when RPV Pressure is within 50 psig of Torus Pressure OR at Chief Examiner's direction.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-2** **Op-Test No.:** **2019-301**

Examiners: ______________ **Operators:** ______________ **SRO**

______________ ______________ **RO**

______________ ______________ **BOP**

Initiating Conditions:	Unit 2 is operating at 85% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Turnover	Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.

Summary:

- **Event 1:** Normal; Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1.
- **Event 2:** Component; Leak in RBCCW System. Isolate RWCU.
- **Event 3:** Component/TS; PSW Pump 2B will experience a sheared shaft and the standby PSW pump will NOT automatically start. The operator will manually start the standby PSW pump 2D to restore system flow/pressure to normal. LCO 3.7.2 Required Action.
- **Event 4:** Component; RFPT 2A experiences high vibration requiring the BOP to manually trip RFPT 2A resulting in Recirc Runback.
- **Event 5:** Reactivity; The ATC will insert control rods to exit the Region Of Potential Instabilities of the Power to Flow map.
- **Event 6:** Component/TS; RCIC will experience an inadvertent start with Trip pushbutton failing to trip RCIC. Operator will shut down RCIC by either; closing T&TV or placing flow controller in manual and lowering speed to prevent injection. SRO will enter TS 3.5.3.
- **Event 7:** Major; Unisolable leak in Reactor Building (RCIC) requiring a Reactor Manual scram. RCIC Group 4 signal failure. (**Critical Task**)
- **Event 8:** HPCI flow controller output fails low requiring the BOP to manually increase speed to obtain HPCI injection.
- **Event 9:** Major; Emergency Depress when > Max Safe in more than one area. (**Critical Task**)

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-2** **Op-Test No.:** **2019-301**

Critical Tasks

- Manually scram the reactor prior to exceeding one area Max Safe Temperature. **(Event 7)**
- Emergency Depress when > Max Safe in more than one area. **(Event 9)**

	ES 301-4 Attributes	Required	Actual	Items
1.	Total Malfunctions	5-8	6	1. Leak in RBCCW System. (**Event 2**) 2. PSW Pump 2B sheared shaft. (**Event 3**) 3. RFPT 2A vibration (**Event 4**) 4. RCIC Inadvertent starts. (**Event 6**) 5. RCIC leak with scram. (**Event 7**) 6. HPCI flow controller fails. (**Event 8**)
2.	Malfunctions After EOP Entry	1-2	1	1. HPCI flow controller fails. (**Event 8**)
3.	Abnormal Events	2-4	3	1. Leak in RBCCW System. (**Event 2**) 2. PSW Pump 2B sheared shaft. (**Event 3**) 3. RCIC Inadvertent starts. (**Event 6**)
4.	Major Transients	1-2	2	1. RCIC leak with scram. (**Event 7**) 2. RCIC leak with ED. (**Event 9**)
5.	EOPs entered, requiring substantive actions	1-2	2	1. RC (Non-ATWS) 2. SC/RR
6.	EOPs contingencies entered with substantive actions	0-2	1	1. CP-1
7.	Preidentified Critical Tasks	≥ 2	2	1. Scram prior to Max Safe Temperature. (**Event 7**) 2. ED when >2 Max Safe Temperatures. (**Event 9**)

ILT 12 NRC DRAFT Scenario 2

SHIFT TURNOVER

target ZERO Every day, every job, safely.	**Safety Focus**
UNIT 1 STATUS	
Plant Conditions:	• Unit 1 is operating at 100% RTP.
Plant Conditions:	• Unit 2 is operating at 85% RTP. • 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
<u>Protected Train:</u> ☒ Division I ☐ Division II	**<u>EOOS:</u>** ☒ Green ☐ Orange ☐ Yellow ☐ Red
Scheduled evolutions:	☐ Perform 34SV-C71-004-2, Reactor Manual Scram Functional Test starting at step 7.1. ☐ After surveillance is complete, raise reactor power to 100% RTP using Recirc flow.
Surveillances due this shift:	☐ 34SV-C71-004-2, Reactor Manual Scram Functional Test
Inop Equipment:	☐ 2D11-K615B, Off gas Post Treatment Radiation monitor has failed Downscale. IAW TS/TRM, I&C has placed 2D11-K615B in the trip condition while maintaining the function of 602-405, Post Treatment O/G Radiation Hi-Hi-Hi/Inop. A Caution Tag is attached to 2D11-K615B switch.
Active tagouts:	☐ NONE
Rod Configuration:	☐ See RWM Step 25

NRC DRAFT

Facility: E. I Hatch **Scenario No.:** 12-3 **Op-Test No.:** 2019-301

Examiners: ____________ **Operators:** ____________ SRO

____________ ____________ RO

____________ ____________ BOP

Initial Conditions. Unit 2 is operating at 85% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.

Turnover: IAW 34SO-N62-001-2, swap Cooler Condensers from 2N62-B003A to 2N62-B003B, starting at step 7.2.2. System has been aligned for 15 minutes. Once complete, raise reactor power to approximately 90% RTP using Recirc flow.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Swap Cooler Condensers from 2N62-B003A to 2N62-B003B IAW 34SO-N62-001-2, starting at step 7.2.2.
2	N/A	R (ATC)	Raise reactor power using Recirc to 90% RTP.
3	mfN21_88A	I (ATC)	Feedwater pump 2A cooling water controller failure
4	mf65702193 mf65702248 mf65702230	C (BOP) TS (SRO)	RCIC NW Diagonal Instrument sump Hi, Hi-Hi & Hi-Hi-Hi alarms; RCIC B004A CLR PSW leak requires swapping to Standby cooler.
5	mfG31_207B svoG31070 mfG31_46	C (ATC) TS (SRO)	RWCU line breaks outside of Primary Containment. Must be manually isolated (**Critical Task**), with failure of inboard isolation valve to close.
6	mfT41_147 diT41-C007B	C (BOP)	Reactor Building Exhaust fans failure. Manually start SBGT fan to re-establish Rx. Building dP.
7	mfS11_161 mfR43_49B mfR43_49C	M (ALL)	Loss of Offsite Power with EDG 1B & 2C failure, EDG 2A starts & ties.
8	mfR43_49A	C (ATC)	One (1) minute after LOSP, EDG 2A trips and must be manually reset to re-start (**Critical Task**)
9	mfG31_242	C (ALL)	Leak in Drywell requiring Torus Sprays to be placed in service.

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

Op-Test No.: 2019-301 Scenario No.: 12-3 Event No.: 1

Event Description: IAW 34SO-N62-001-2, swap Cooler Condensers from 2N62-B003A to 2N62-B003B, step 7.2.2.

Time	Position	Applicant's Actions or Behavior
10 Min	SRO	Directs BOP to swap Cooler Condensers from 2N62-B003A to 2N62-B003B IAW 34SO-N62-001-2, step 7.2.2.
		The BOP will perform the following at 2N62-P001 panel. ***NOTE:*** *ALARM 600-020, Inlet Flow To Stack High, may alarm when 2N62-F025B is opened. This is normal for this condition and the alarm will clear in approximately one minute.* ***NOTE:*** *SIMULATOR OPERATOR, NOTIFY BOP, using Time Compression, 15 minutes has elapsed.*
	BOP	• Monitors 2N62-R605, Glycol Pump Disch pressure indicator and starts 2N62-C001B, Glycol Sys Pump B • Opens the following valves: • 2N62-F026B, Glycol Sys To Cndsr B (Already OPEN in setup). • 2N62-F071B, Glycol Sys From Cndsr B (Already OPEN in setup). • 2N62-F025B, Clr Cndsr B Inlet
	BOP	• Closes the following valves: • 2N62-F026A, Glycol Sys To Cndsr A. • 2N62-F071A, Glycol Sys From Cndsr A. • 2N62-F025A, Clr Cndsr A Inlet. • Stops 2N62-C001B, Glycol Sys Pump B. • Confirms Glycol Pump discharge pressure remains at 10 to 20 psig, on 2N62-R605, Glycol Pump Disch pressure. • Notifies SRO that the Cooler Condensers have been swapped.
		SIMULATOR OPERATOR – PROCEEDS with the next event at the Chief Examiners request.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 2

Event Description: Raise reactor power to 90% using Recirc System.

Time	Position	Applicant's Actions or Behavior
10 Min	SRO	• Directs ATC to raise reactor power to 90% RTP by increasing Recirc flow. Power increases are NOT to exceed 10 MWe/min.
		NOTE: *May get the RBM UPSCALE, (603-202) and ROD OUT BLOCK, (603-238) alarm, if a peripheral control rod is NOT selected. This is expected, and the operator MAY select a peripheral rod at this time.* *MAY also get Alarm HEATER TROUBLE, (650-135), alarm. This is expected at this power level.*
	ATC	• IAW 34SO-B31-001-2 (step 7.1.5) & 34GO-OPS-005-2, the ATC increases Recirc pump speed, NOT to exceed 10 MWE per minute by depressing the RAISE SLOW or RAISE MEDIUM pushbuttons on the Master (P603 panel) or Individual controls (P602 panel) until reactor power is 95%. • If using Individual Controls, pump speed increases will alternate between the “A” & “B” Recirc pumps to prevent excessive flow mismatches. • Monitors power increase by observing APRM and generator output indications.
	ATC	• Complies with 34SO-B31-001-2, Limitation 5.2.15, which states: WHEN changing Recirc pumps speed while in Two Loop operation maintain pump speeds to limit recirculation loop jet pump mismatch within the following limits: • <10% of rated core flow (7.7 E6 lbm/hr) WHEN operating < 70% of rated core flow; AND • <5% of rated core flow (3.85 E6 lbm/hr) WHEN operating at > 70% of rated core flow.
	ATC	Notifies the SRO that reactor power has been raised to 90%.
		SIMULATOR OPERATOR, at the Chief Examiners direction OR after power has been increased to 90% RTP, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 3 Page 4 of 23

Event Description: RFPT 2A Cooling water controller failure. Time Compression repair & return to Automatic.

Time	Position	Applicant's Actions or Behavior
8 Min		*At the Chief Examiner's direction, SIMULATOR OPERATOR, INSTRUCT the BOP operator by phone to stay on the line until told to hang up, THEN ENTER: (**RB-3**) mfN21_88A, Feedwater Pump Lube Oil Cooling System Failure.*
	ALL	The following alarms will annunciate: • RFPT 2A BRG OIL TEMP HIGH, (650-313) • RFPT 2A BRG TEMP HIGH, (650-329) • RFP/COND BRG METAL TEMP HIGH, (650-112), (approximately 1 minute later if 2A RFPT PSW TCV is NOT opened in a timely manner)
		***NOTE**: The ATC may immediately place the controller in manual IAW 31GO-OPS-021-0, Manipulation and Control of Equipment OR NMP-OS-007-001, Conduct of Operations Standards and Expectations, responding to a failed controller.*
	ATC	• Addresses the high temp annunciator, pulling the ARP and confirms temperatures: • Dispatches BOP to panel 2H11-P655, checks all temperature indicators on 2N32-R616 to determine actual oil temperatures. • Confirms that RFPT 2A Oil Temp controller, 2P41-R602, on panel 2H11-P650 is adjusted for 110 to 130°F.
	ATC	• Recognizes the automatic function of the controller has failed, closing the cooling water valve. • Places the controller in manual, depresses the open/increase pushbutton, opening the valve. Oil temperatures begin decreasing and the alarm extinguishes.
	SRO	Notifies maintenance of the 2P41-R602, RFPT temperature controller, problem.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-3 Event No.: 4		Page 5 of 23
Event Description:	RCIC NW Diagonal Instrument sump Hi & Hi-Hi-Hi alarms; RCIC B004A CLR PSW leak requires swapping to Standby cooler.	

Time	Position	Applicant's Actions or Behavior
15 Min		*SIMULATOR OPERATOR at direction of the Chief Examiner's direction, ACTIVATE: (**RB-4**) svoT48146, Level in Reactor Building NW Sump, Final 12, Ramp 5. **EGT41-7** will modify svoT48146 with the cooler swapped with 2T45-F006 open and will also insert **EGT41-8**. **EGT41-8** will modify svoT48146 if cooler is placed back in service and will also insert **EGT41-7**.*
	ALL	• Receives alarms: • PANEL 2H11-P657 SYSTEM TROUBLE, (650-224) • RCIC N-W DIAG INSTR SUMP LVL HIGH-HIGH-HIGH, (657-014) • RCIC N-W DIAG INSTR SUMP LVL HIGH, (657-051) • RCIC N-W DIAG INSTR SUMP LVL HIGH-HIGH, (657-069)
	SRO	• Directs BOP to enter above annunciator response procedures.
		NOTE: *Either ARP will be okay to use for proper actions to take.*
	BOP	• Enters 657-014 and performs the following: • Notifies SSS to dispatch a SO to monitor the local water level indication on the level stick in the RCIC N-W Diagonal. • Enters 34AB-T22-003-2, Secondary Containment Control. • Panel 2H11-P654, places 2T45-F006, RCIC Sump Isol valve, in AUTO and confirm valve OPENS.
	BOP	• Enters 657-051 and performs the following: • Notifies SSS to locate AND isolate the source of in-leakage into the RCIC Compartment Instrument Sump. • Panel 2H11-P654, places 2T45-F006, RCIC Sump Isol valve, in AUTO and confirm valve OPENS.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 4

Event Description: RCIC NW Diagonal Instrument sump Hi & Hi-Hi-Hi alarms; RCIC B004A CLR PSW leak requires swapping to Standby cooler.

Time	Position	Applicant's Actions or Behavior

	BOP	• Enters 657-069 and performs the following:
		  • Notifies SSS to locate AND isolate the source of in-leakage into the RCIC Compartment Instrument Sump.
		  • Panel 2H11-P654, places 2T45-F006, RCIC Sump Isol valve, in AUTO and confirm valve OPENS.

		SIMULATOR OPERATOR, three (3) minutes after a SO has been dispatched, reports there is one (1) inch of water on the floor in the RCIC Diagonal. The leak is coming from the RCIC B004A Room Cooler and is spraying water directly on the floor.
	SRO	• Directs BOP to shut down RCIC B004A Room Cooler and start RCIC B004B Room Cooler • Reviews TRM T3.7.2 • IAW T3.7.2 Condition C, determines the following: Restore room cooler to Functional status within 30 days OR Obtain Corporate Nuclear Engineering and Licensing Department evaluation justifying extended Completion Time within 30 days.
		SIMULATOR OPERATOR ENSURES ***EGT41-1*** *removes malfunction when the coolers are swapped and 2T45-F006 is open.*

	BOP	• IAW 34SO-E51-001,
		  • Places 2T41-B004B, RCIC Pump Rm Cooler, control switch to RUN.
		  • Places 2T41-B004A, RCIC Pump Rm Cooler, control switch to AUTO or OFF.
		• Notifies SRO 2T41-B004B is in service and 2T41-B004A is off.
		• When 657-014 and 657-051 alarms clear, places 2T45-F006, RCIC Sump Isol valve, in close and confirms valve closes.

		SIMULATOR OPERATOR, after the BOP has swapped RCIC Pump Room coolers, REPORTS that the water spray is almost stopped, and you have closed 2P41-F016A, PSW Outlet valve from RCIC Pump Room Cooler, 2E51-B004A. There is NO more leakage from the RCIC Pump Room Cooler.
		SIMULATOR OPERATOR, at the Chief Examiner's request, proceeds to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 5		
Event Description:	RWCU line will break outside of Primary Containment. Manual actions required to isolate the leak. (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior
10 Mins		*SIMULATOR OPERATOR: At the direction of the Chief Examiner, Call the BOP and request the value for Off Gas flow. When the BOP is at 2N62-P600, ENTER malfunction mfG31_46, final: 0.5398, ramp: 0.05 (**RB-5**).*
	ALL	Recognizes the following alarms: • RX BLDG RADIATION HIGH, (601-306) (~20 seconds) • TIP MACHINE AREA RADIATION HIGH, (601-323) approximately 6.0 minutes later indicating ~ 20 mr/hr • LEAK DET AMBIENT TEMP HIGH, (601-327) approximately 8.0 minutes
		NOTE: *If 2G31-F001 is closed in a timely manner, the failure of the auto isolation may NOT be recognized.*

	ATC	Responds to RX BLDG RADIATION HIGH, (601-306) annunciator
		• Determines radiation levels are approximately 100 mr/hr on the following ARMs:
		  • RB 158' AREA S-E, 2D21-K601B
		  • RB 158' area N-E, 2D21-K601C
		  • RB 158' area N-W, 2D21-K601D
		  • Decant pump and equipment room area 158', 2D21-K601L
		
		• Determines that a RWCU isolation is required and performs the following:
		  • Confirms automatic actions by:
		    • Tripping RWCU Pump 2B
		    • Places control switch for 2G31-F004 to close (will NOT Manual or Auto close)
		    • Places control switch 2G31-F001 to the close (**Critical Task**)
		    Critical Task is met if 2G31-F001 is closed prior to any area exceeding the Maximum Safe Operating Levels (1000 mr/hr in approximately 11 minutes).
		  • Enters 34AB-G31-001-2, RWCU System Isolation.
		  • Notifies SRO of conductivity monitoring requirements of TRM T3.4.1.
		  • Notifies SRO of possible SC-Secondary Containment Control Entry.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 5

Event Description: RWCU line will break outside of Primary Containment. Manual actions required to isolate the leak. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
	ATC	• Makes a Page Announcement to evacuate the Unit 2 Reactor Building due to high radiation, if NOT performed by the BOP. • Notifies SRO the failure of 2G31-F004 to close. • Suspects a leak has occurred and enters 34AB-T22-001-2, Primary Coolant System Pipe Break Reactor Building. • Informs ATC to monitor level and power.
	SRO	• Dispatches SO to determine RWCU leak location. • Enters SC/RR EOP flowchart and directs the ATC to trip and isolate the RWCU System. • Dispatches SO/Maintenance to determine why 2G31-F004 did NOT manually close. • May request SSS to draft a Danger Tagout for 2G31-F004.
	SRO	• Enters TS for 2G31-F004. • Determines that LCO 3.6.1.3.A.1 and A.2 applies and the RWCU Line must be isolated within 4 hours and verified closed every 31 days. • May review TRM T 3.4.1 RCS Chemistry, TSR 3.4.1.1 for continuous conductivity monitoring and determines that with the Recorder 2G31-R601 Select switch in the Reactor Water position on 2H11-P602, a TRACKING RAS exists.
		SIMULATOR OPERATOR, at the direction of the Chief Examiner, PROCEEDS to next event.

Op-Test No.: 2019-301 Scenario No.: 12-3 Event No.: 6		Page 9 of 23
Event Description:	Reactor Building Exhaust fans failure. Manually start SBGT fan to re-establish Rx. Building dP.	

Time	Position	Applicant's Actions or Behavior
15 Min		*At Chief Examiners direction, SIMULATOR OPERATOR ENTERS* ***(RB-6)*** *mfT41_147, Rx Bldg. Exhaust Fan A fails & diT41-C007B, Rx Bldg. Exhaust Fan B switch to OFF.*
	ALL	On the 2H11-P650 Panel alarms 650-214, Panel 2H11-P654 Panel System Trouble and 650-224, Panel 2H11-P657 Panel System Trouble are received.
	BOP	• Announces the alarm to the SRO.
	SRO	• The SRO dispatches the BOP operator to the 2H11-P654 & P657 panels.
		NOTE: *This failure will require entry into the SC EOP Flow Chart as well as two Abnormal procedures. The success path is to place SBGT in service.*
		NOTE: *When the operator enters 657-081, then the following actions will be addressed to place one (1) Rx Bldg. Exhaust Fan back in service (will NOT run).*
	BOP	Acknowledges 657-081, RB EXHAUST FAN 2T41-C007A/B FLOW LOW, alarm and enters 657-081.
		• Confirms the Standby Rx Bldg Vent Exhaust Fan has NOT automatically started. • The operator will place the control switch for 2T41-C007A to OFF AND 2T41-C007B to RUN. • Confirms 2T41-C007B will NOT start. May place 2T41-C007B to OFF. • Notifies SRO that neither Rx. Bldg. Exhaust Fan will run.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 6

Event Description: Reactor Building Exhaust fans failure. Manually start SBGT fan to re-establish Rx. Building dP.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs operator to start SBGT to restore Reactor Bldg. dP. • Enters SC/RR EOP flowchart.
	BOP	Starts the 2A or 2B SBGT with a suction from the Reactor Building by performing the following:

		• At 2H11-P657 for 2A or 2H11-P654 for 2B performs the following action IAW the SBGT Placard or 34SO-T46-001-2, SBGT System.
		  • Opens 2T46-F001A(B)
		  • Places SBGT A(B) in RUN position.
		  • Confirms 2T46-F002A(B) OPENS.
		  • Confirms SBGT A (B) HTR Red Light ILLUMINATES.
		  • Confirms SBGT Flow increases to 1500 - 4000 SCFM.
		  • Once SBGT 2A or 2B are started, confirms 654-001, RB Inside To Outside Air Diff Press Low, clears and notifies SRO.

	BOP	• Enters 34AB-T22-003-2, Secondary Containment Control.
		  • Monitors secondary containment parameters.
		  • Notifies the SRO to enter 31EO-EOP-014-2, EOP Secondary Containment flowchart due to low RB dp.
		  • Dispatches a SO/Maintenance to investigate the low RB dp.
		  • Enters 34AB-T22-002-2, Loss of Secondary Containment Integrity.

		SIMULATOR OPERATOR, at Chief Examiner's direction, move on to the next Event

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 7

Event Description: Loss of Offsite Power.

Time	Position	Applicant's Actions or Behavior
15 Mins		*SIMULATOR OPERATOR: At the direction of the Chief Examiner, ACTIVATE (**RB-7**), mfS11_161, Loss of Offsite Power & mfR43_49B, DG Low Lube Oil Pressure 1B & mfR43_49C, DG Low Lube Oil Pressure 2C.*
	ALL	Recognize a Loss Of Offsite Power.
		NOTE: *With a Loss of Offsite Power, the pertinent operator RC-2 actions are limited to checking ECCS.*
	SRO	• Calls for maintenance support in restoring all emergency 4160 VAC buses. • Enters the RC EOP flowchart and directs a RWL band of +3 - +50 inches.
	ATC	May enter 34AB-R22-003-2, Station Blackout, until the appropriate EDGs are supplying power to emergency buses.
		NOTE: *The SRO may assign one operator to perform Scram procedure placards RC-1, RC-2 and RC-3.*
	SRO	• Assigns the ATC to perform RC-1. • Assigns the BOP operator to perform RC-2 and RC-3. • If time allows assigns TC-1 to be performed. • Enters the RC EOP flow chart, 31EO-EOP-010-2, once RWL lowers to 3 inches or RPV pressure rises to 1074 psig. • Directs EOP RC level control band of +3 inches to +50 inches.
	ATC	Performs RC-1 consisting of: • Inserts a manual scram. • Places the mode switch to SHUTDOWN • Confirms all rods are inserted by observing full in lights, SPDS, or the RWM display. • Notifies the SRO of rod position check. • Places SDV isolation valve switch to ISOLATE & confirms closed. • Inserts SRMs and IRMs. • Shifts recorders to read IRMS, when required. • Ranges IRMS to bring reading on scale. • Notifies the SRO when the above actions are complete.
		NOTE: *With a Loss of Offsite Power, the pertinent operator RC-2 actions are limited to checking ECCS.*

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 7		
Event Description: Loss of Offsite Power.		
Time	**Position**	**Applicant's Actions or Behavior**
	BOP	Checks ECCS Injection Systems and verifies no initiation signal present.
		Performs RC-3 consisting of: • Monitor RPV pressure. • Confirm proper operation of pressure control system (LLS and SRVs). • If necessary, allows RPV pressure to exceed 1074 psig then cycles any SRV to initiate LLS. • Maintain RPV pressure between 1074 and 800 psig. • Notify SRO that LLS is the pressure control system.
		SIMULATOR OPERATOR, PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.: 12-3 Event No.: 8**	Page 13 of 23
Event Description:	One (1) minute after LOSP, EDG 2A trips and must be manually reset to start (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior
15 min		***NOTE:*** *EDG 2A malfunction was inserted one (1) minute after the reactor mode switch was placed into SHUTDOWN by Event Trigger **EGR43-8**.* *EDG 1B & EDG 2C malfunctions was inserted during the Major.*
	SRO	• Directs ATC to address the plant electrical systems and enter the Station Black abnormal procedure, 34AB-R22-003-2, and Diesel Generator Recovery abnormal, 34AB-R43-001-2. • Calls for maintenance support in restoring all emergency 4160 VAC buses.
		The ATC may start first with any of the Diesel Generators.
	ATC	Confirms appropriate Diesel Generator response to the event and evaluates the emergency buses determining: • 2A EDG is tripped (Emergency Engine S/D), 2E bus is de-energized • 1B EDG is tripped (Emergency Engine S/D), 2F bus is de-energized • 2C EDG is tripped (Emergency Engine S/D), 2G bus is de-energized • Enters 34AB-R22-003-2, Station Blackout and Diesel Generator Recovery, 34AB-R43-001-2.
	ATC	• IAW 34AB-R43-001-2, Diesel Generator Recovery, for EDG 2C: • Determines the DG is NOT running • Determines the Auto Start System Operative Light is NOT lit • Depresses the Shutdown Relay Pushbutton • Determines the DG did NOT start • Sends a SO to locally start the DG • Sends a SO/Maintenance to investigate DG failure

Op-Test No.: 2019-301	**Scenario No.: 12-3 Event No.: 8**	Page 14 of 23
Event Description:	One (1) minute after LOSP, EDG 2A trips and must be manually reset to start (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior
	ATC	Reviews DG 1B annunciators and determines a LUBE OIL PRESS LOW, (652-211) and EMERGENCY ENGINE SHUTDOWN, (652-229).
		IAW 34AB-R43-001-2, Diesel Generator Recovery, for EDG 1B: • Determines the DG is NOT running • Determines the Auto Start System Operative Light is NOT lit • Depresses the Shutdown Relay Pushbutton • Determines the DG did NOT start • Sends an SO to locally start the DG • Sends an SO/Maintenance to investigate DG failure
	ATC	Reviews DG 2A annunciators and determines a LUBE OIL PRESS LOW, (652-111) and EMERGENCY ENGINE SHUTDOWN, (652-129).
		• IAW 34AB-R43-001-2, Diesel Generator Recovery, for DG 2A: • Determines the DG is NOT running. • Determines the Auto Start System Operative Light is NOT lit. • Depresses the Shutdown Relay Pushbutton. • After 100 second time delay, determines DG 2A started and energized 4160VAC Emergency Bus 2E. (**Critical Task**) (*Critical Task is met if Emergency Bus 2E is energized within 15 minutes based on forcing the plant into a higher level of EAL classification when NOT required*) • Notifies SRO that 4160VAC Emergency Bus 2E is energized.
		SIMULATOR OPERATOR: *When called to investigate the EDGs, as the SO, wait two minutes and report as Maintenance:* • *IF EDG 2A has NOT been RESTARTED, report that no trip condition exists.* • *EDG 1B has a break on the oil pump discharge line* • *EDG 2C has a trip signal in its Shutdown circuit.*

Op-Test No.: 2019-301	Scenario No.: 12-3	Event No.: 8	Page 15 of 23
Event Description:	One (1) minute after LOSP, EDG 2A trips and must be manually reset to start (Critical Task)		

Time	Position	Applicant's Actions or Behavior
		The following can be performed in any order.

	ATC/BOP	As time allows, directs the SSS to perform the following:
		• RPS MG Set 2A - restarted
		• RPS Alternate Supply from 2A Essential Cabinet - restarted
		• 2A SSAC local breaker - reclosed
		• Division I Station Service Battery Chargers (may depress pushbuttons on P664 panel)
		• Vital AC Alternate supply returned to service
		• Restores RBCCW as follows:
		  • Directs SO to close discharge valve 2P42-F005A, or F005C
		  • Places RBCCW pump control switch to off and then to auto
		  • Directs SO to slowly open discharge valve 2P42-F005A, or F005C
		  • Starts second pump by taking control switch to off and then to run

		The following can be performed in any order. 34AB-R22-003-2, Station Blackout, will be exited when the 2 4160VAC Emergency Buses are energized.

	ATC	Enters 34AB-R22-003-2, Station Blackout, and performs Attachment 3, 4160VAC 2E Emergency Bus Restoration:
		1. Confirms Running/Starts 2P41-C001A, 2A PSW Pump
		2. Closes 2P41-F316A, Division I Turbine Building PSW Isolation Valve
		3. Since RCIC will control RWL, directs BOP to secure HPCI
		4. Trips the following equipment control switches:
		  • 2C11-C001A, CRD Pump 2A, panel 2H11-P603 (Norm) ☐
		  • 2E21-C001A, Core Spray Pump 2A, panel 2H11-P601 (Norm) ☐
		  • 2P64-B006A, Drywell Chiller 2A, panel 2H11-P700 (Off)
		5. At panel 2H11-P652, resets the 600VAC Bus 2C Nonessential Load lockout pushbutton
		6. Restore Division l Station Service Battery Chargers per the following:
		  • Depresses 2R42-S026, Battery Charger 2A pushbutton, panel 2H11-P664
		  • Depresses 2R42-S027, Battery Charger 2B pushbutton, panel 2H11-P664
		  • Depresses 2R42-S028, Battery Charger 2C pushbutton, panel 2H11-P664
		7. Starts 2Z41-C014, Station Service Battery Room 2A Exhaust Fan, panel 2H11-P657.

		Simulator Operator, at the Chief Examiner's direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 9

Event Description: Leak in Drywell requiring Torus Sprays to be placed in service.

Time	Position	Applicant's Actions or Behavior
		*SIMULATOR OPERATOR, Event Trigger **EGC71-17**, ACTIVATED the following malfunction when the Reactor Mode switch was placed in SHUTDOWN:* *mfG31_242 RWCU Non-Isol Leak in Drywell, (Final 0.12 Ramp 1000)*
	ALL	Recognizes increasing Containment Pressure from the following alarms: • PRIMARY CNMT HIGH PRESSURE TRIP, (603-106). • PRIMARY CNMT PRESSURE HIGH, (603-115). • DRYWELL PRESSURE HIGH, (602-210).
		NOTE: *The SRO may select an RPV pressure band which will lower the driving head of the leak while maintaining <100°F/hr RPV cool down (typically between 500 psig & 920 psig).*
	SRO	As time allows, may; • Direct the ATC to decrease reactor pressure to reduce the driving head of the leak using SRVs. • Enters the PC EOP flow chart • May direct operator to restart Drywell Chillers and Cooling Fans IAW EOP-100.
	SRO	Per the PC flowchart, as directed by Primary Containment Pressure, verifies Torus level is <285 inches and directs an operator to place Torus Sprays in service. May direct operator to place Torus Cooling in service if Torus temperature exceeds 95°F.

Op-Test No.: **2019-301** **Scenario No.:** **12-3** **Event No.:** **9**

Event Description: Leak in Drywell requiring Torus Sprays to be placed in service.

Time	Position	Applicant's Actions or Behavior
	ATC	• Sprays the Torus per 34SO-E11-010-2 placard on the 2H11-P601 Panel as follows: • Places Cnmt Spray Vlv Cntl switch in the MANUAL position. • Confirms/Starts RHR pump in loop A, if NOT already running • Opens 2E11-F028A • Opens 2E11-F027A • Throttles Open 2E11-F027A • Notifies SRO that RHR is in Torus Sprays
		NOTE: *The operator may place Torus Cooling in service by using the Placard that's available or using the appropriate section of the procedure. These steps assume the Placard is used. The A loop of RHR will be used.*
	BOP	• Enters 34SO-E11-010-2, Residual Heat Removal • Places RHRSW in service • Overrides 2E11-F068A Low Discharge Pressure Interlock • Positions 2E11-F068A to 45% OPEN • Receives alarm, RHR HX A DIFF PRESS LOW, (601-313) • Starts RHRSW pump A • Places 2E11-F068A Low Discharge Pressure Interlock switch to normal position. • Positions 2E11-F068A to obtain < 4400 gpm AND < 450 psig

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 9

Event Description: Leak in Drywell requiring Torus Sprays to be placed in service.

Time	Position	Applicant's Actions or Behavior
	BOP	• Places RHR A Loop in Torus cooling per the placard by performing the following steps: • Opens 2E11-F048A • Opens 2E11-F047A. • Opens 2E11-F003A. • Confirms/Starts RHR pump in loop A, if NOT already running • Receives alarm, RHR LOW FLOW, (601-222) • Opens 2E11-F028A • Receives alarm, AUTO BLOWDOWN CS OR RHR PRESS PERMISSIVE, (602-312) • Receives alarm, SEC SYSTEM AUTO INITIATION SIGNAL PRESENT, (650-234) • Throttles OPEN 2E11-F024A • Alarm, RHR LOW FLOW, (601-222), clears • Ensures RHR flow is < 11,500 GPM, THEN Closes 2E11-F048A • Notifies the SRO that RHR "A" loop is in service.
	SRO	• As time allows, directs an operator to perform 31EO-EOP-114-2 for RHR & CS
		NOTE: *Torus pressure is NOT expected to exceed 11 psig due to the leak in the Drywell.*
	SRO	• If time allows, directs H_2/O_2 Analyzers placed in service IAW 34SO-P33-001-2.
	BOP	Notifies the SSS to perform actions to prevent injection from RHR & CS IAW 31EO-EOP-114-2.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 9		Page 19 of 23
Event Description:		Leak in Drywell requiring Torus Sprays to be placed in service.
Time	**Position**	**Applicant's Actions or Behavior**

		NOTE: RHR & CS Loop B does not have power to close valves/trip pumps.
	BOP	Prevents injection IAW 31EO-EOP-114-2, the operator performs the following: • CLOSES RHR OUTBD INJ VLV, 2E11-F017A • Notifies SSS to OPEN links & INSTALL jumpers for 2E11-F017A • CLOSES RHR OUTBD INJ VLV, 2E11-F017A • Confirms/CLOSES INBD DISCHARGE VLV, 2E21-F005A • Trips Core Spray Pump A, 2E21-C001A • Notifies SRO 31EO-EOP-114-2 actions for RHR & CS are complete for RHR & CS Loop A
	ATC	• Places H_2/O_2 Analyzers in service IAW 34SO-P33-001-2 • Depresses Channel A and Channel B Reset pushbuttons on 2H11-P700 panel. • Confirms Analyzers are running. • Notifies SRO H_2/O_2 Analyzers are in service.

Op-Test No.: 2019-301 **Scenario No.:** 12-3 **Event No.:** 9		Page 20 of 23
Event Description:	Leak in Drywell requiring Torus Sprays to be placed in service.	

Time	Position	Applicant's Actions or Behavior
		NOTE: If crew addresses restoring DW Chillers they will NOT be able to due to Drywell temperature above 250°F.

	ATC	If directed, restores drywell chillers per 31EO-EOP-100-2 section 3.7 by:
		• Verifies chilled water expansion tank is within normal level, (NO high/low alarms on 2H11-P700 panel or verify locally).
		• Verifies D/W temperature is <250°F, in the vicinity of 2T47-B007A / 2T47-B007B. SPDS points N001A and N010 can be used for 2T47-B007A and N001K and N002 can be used for 2T47-B007B. These points can be read directly from the SPDS Diagnostic Screen for Drywell temperature.
		• Notifies SSS to place switch for 2P64-C008A, Chilled Water pump, to RUN & then verify Chilled Water return temperature is <100°F.
		• Place 2P64-S3, LOCA Override Switch, to BYPASS on panel 2H11-P700.
		• Notifies SSS to:
		    • Open link, Lower TB4-12 in 2R22-S005 Fr. 6, for 2P64-B006A.
		    • Reset 86 lockout relays on drywell chiller breaker on 4160V bus 2E (2R22-S005 Fr. 11).
		    • Reset the POR relay for chiller.
		• Monitors for chiller start by observing the red light on 2H11-P700 or input from the SSS.

	ATC	If directed, restores the drywell coolers per 31EO-EOP-100-2 section 3.6 by: • Verifies chilled water expansion tank is within normal level, (NO high/low alarms on 2H11-P700 panel or verify locally) • Verifies D/W temperature is <250°F, in the vicinity of 2T47-B007A / 2T47-B007B. • Notifies SSS to place switch for 2P64-C008A, Chilled Water pump, to RUN & then verify Chilled Water return temperature is <100°F. • Places drywell cooling fans system A key-lock LOCA override switch to BYPASS on 2H11-P657. • Places drywell cooling fans system B key-lock LOCA override switch to BYPASS on 2H11-P654. • Observes the drywell cooler fans start by observing their red lights illuminating on 2H11-P654 and panel P657.
		With Chief Examiners Permission, the Scenario will be terminated when RWL is controlled in band and Torus Sprays are in service and 4160 VAC 2E Emergency bus is energized or as directed by the Chief Examiner.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-3** **Op-Test No.:** **2019-301**

Examiners: ____________ **Operators:** ____________ **SRO**

____________ ____________ **RO**

____________ ____________ **BOP**

Initiating Conditions:	Unit 2 is operating at 85% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Turnover	IAW 34SO-N62-001-2, swap Cooler Condensers from 2N62-B003A to 2N62-B003B, starting at step 7.2.2. System has been aligned for 15 minutes. Once complete, raise reactor power to approximately 90% RTP using Recirc flow.

Summary:

- **Event 1:** Normal; Swap Cooler Condensers from 2N62-B003A to 2N62-B003B IAW 34SO-N62-001-2.
- **Event 2:** Reactivity; Raise reactor power to 90% using Recirc System.
- **Event 3:** Instrument; Feedwater pump 2A cooling water controller will fail requiring the ATC to maintain cooling water manually.
- **Event 4:** Component/TS/TRM; RCIC NW Diagonal Instrument sump hi & hi-hi-hi alarms; RCIC B004A CLR PSW leak which requires swapping to Standby cooler.
- **Event 5:** Component/TS; A RWCU line will break outside of Primary Containment. The inboard and outboard isolation valves fail to close automatically. The operator will take manual actions to isolate the leaking RWCU line. (**Critical Task**) The SRO addresses Tech Specs for inoperable Primary Containment Isolation Valves.
- **Event 6:** Component; Reactor Building Exhaust fans failure. The operator takes manual control to place SBGT in service to re-establish the required Reactor Building dP.
- **Event 7:** Major; The plant will experience a Loss of Offsite Power with EDG 1B & 2C failures, 2A EDG initially starts & ties.
- **Event 8:** Component; One (1) minute after LOSP, EDG 2A trips and must be manually reset to re-start. (**Critical Task**)
- **Event 9:** Component; The plant experiences a leak in the Drywell causing Torus Sprays to be placed into service.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-3** **Op-Test No.:** **2019-301**

Critical Tasks

- Closes 2G31-F001 prior to exceeding Maximum Safe Secondary Containment Control EOP parameters (Temperatures, Radiation levels or SC water levels). **(Event 5)**

- Manually reset EDG 2A Emergency Shutdown. (**Event 8**)

	ES 301-4 Attributes	Required	Actual	Items
1.	Total Malfunctions	5-8	7	1. RFP 2A cooling water failure. **(Event 3)** 2. RCIC cooler leak **(Event 4)** 3. RWCU line break (**Event 5)** 4. RB Exh. fan failure **(Event 6**) 5. LOSP with EDG 1B & 2C failures **(Event 7)** 6. EDG 2A trips – must be reset **(Event 8)** 7. DW leak **(Event 9)**
2.	Malfunctions After EOP Entry	1-2	2	1. 2A EDG trips – must be reset **(Event 8)** 2. DW leak **(Event 9)**
3.	Abnormal Events	2-4	3	1. RCIC cooler leak **(Event 4)** 2. RWCU line break (**Event 5)** 3. RB Exh. fan failure **(Event 6**)
4.	Major Transients	1-2	1	1. LOSP **(Event 7)**
5.	EOPs entered, requiring substantive actions	1-2	1	1. RC (Non-ATWS) 2. PC
6.	EOPs contingencies entered with substantive actions	0-2	1	1. LOSP (34AB-R22-003-2, SBO) **(Event 7)**
7.	Preidentified Critical Tasks	$\geq$ 2	2	1. RWCU line break (**Event 5)** 2. 2A EDG trips – must be reset **(Event 8)**

ILT 12 NRC DRAFT Scenario 3

SHIFT TURNOVER

	Safety Focus
UNIT 1 STATUS	
Plant Conditions:	• Unit 1 is operating at 100% power
UNIT 2 STATUS	
Plant Conditions:	• Unit 2 is operating at 85% RTP. • 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Protected Train: ☒ Division I ☐ Division II	**EOOS:** ☒ Green ☐ Orange ☐ Yellow ☐ Red
Scheduled evolutions:	☐ IAW 34SO-N62-001-2, swap Cooler Condensers from 2N62-B003A to 2N62-B003B, starting at step 7.2.2. System has been aligned for 15 minutes. ☐ Once complete, raise reactor power to approximately 90% RTP using Recirc flow.
Surveillances due this shift:	☐ NONE
Inop Equipment:	☐ 2D11-K615B, Off gas Post Treatment Radiation monitor has failed Downscale. IAW TS/TRM, I&C has placed 2D11-K615B in the trip condition while maintaining the function of 602-405, Post Treatment O/G Radiation Hi-Hi-Hi/Inop. A Caution Tag is attached to 2D11-K615B switch.
Active tagouts:	☐ NONE
Rod Configuration:	☐ See RWM Step 26

NRC DRAFT

Facility: E. I Hatch **Scenario No.:** 12-4 **Op-Test No.:** 2019-301

Examiners: ____________ **Operators:** ____________ SRO
____________ ____________ RO
____________ ____________ BOP

Initial Conditions. Unit 2 is operating at 63% RTP preparing to remove 2A RFPT from service. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.

Turnover: Reduce reactor power using Recirc to 60% RTP for RFPT 2A removal. Leave RFPT 2A wind milling until Maintenance requests a Danger tag out.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC)	Reduce reactor power using Recirc to 60% for RFPT 2A removal.
2	N/A	N (BOP)	Remove 2A RFPT from service and leave wind milling.
3	rfC11_141	TS (SRO)	The Backup SDV valves will close due to a small air leak on 2C11-F040 requiring the SRO declare a TS Required Action Statement.
4	aoN40R600 mf65111604 mf65111605	C (ATC)	UAT 2B Hi temperature / swap house loads / remove from service.
5	mfB21_229A	C (BOP) TS (SRO)	Small leak on Feedwater line 2A in the DW requiring SBGT to vent DW.
6	mfC11_299	C (ATC)	CRD Flow Controller fails in Auto requiring manual operation to re-establish CRD flow.
7	svoD11094 svoD11095	I (BOP)	Hi Rad Instrument on SBGT train requiring swapping to other SBGT.
8	mfB21_229A diC11B-S4A diC11B-S4B EGC71-4	M (ALL)	Leak on the "A" FW line in the DW worsens/ruptures requiring a reactor shutdown. Small RWCU leak in DW.
9	mfE51_109 mfG31_242	M (ALL)	Loss of High Pressure Feed requiring an Emergency Depress on low RWL. Loss of Condensate System & RCIC. Small leak in DW. Emergency Depress before -180" RWL. (**Critical Task**)
10	mfE11_42A mfE11_42B diE21-F005A diE21-F005B	C (ALL)	Failure of RHR/CS to auto open on LOCA signal. Manual works ONLY for CS F005A & F005B. (**Critical Task**)

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

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 1			
Event Description:	Reduce reactor power using Recirc to ~60% to achieve a Feedwater flow <7 mlbm/hr for RFPT 2A removal.		

Time	Position	Applicant's Actions or Behavior
15 Mins	SRO	• Directs ATC to reduce reactor power using Recirc to 60% to achieve a Feedwater flow <7 mlbm/hr for RFPT removal. Power decreases should be made as recommended by the STA/Reactor Engineering at a rate NOT to exceed 10 MWe/min.
	ATC	• IAW 34SO-B31-001-2, the ATC decreases Recirc pump speed, NOT to exceed 10 MWE per minute by depressing the LOWER SLOW or LOWER MEDIUM pushbuttons on the Master or Individual controls until reactor power is 60%. Monitors power decrease by observing APRM and generator output indications. • Monitors Total Feedwater flow to achieve Feedwater flow <7 mlbm/hr on 2C32-R604A, 2C32-R604B, and 2C32-R607. • Notifies SRO when Feedwater flow is <7 mlbm/hr.
	ATC	• Complies with 34SO-B31-001-2 , Limitation 5.2.15, which states: WHEN changing Recirc pumps speed while in Two Loop operation maintain pump speeds to limit recirculation loop jet pump mismatch within the following limits: • <10% of rated core flow (7.7 E6 lbm/hr) WHEN operating < 70% of rated core flow; AND • <5% of rated core flow (3.85 E6 lbm/hr) WHEN operating at > 70% of rated core flow.
		NOTE: *May get the RBM UPSCALE, (603-202) and ROD OUT BLOCK, (603-238) alarm, if a peripheral control rod is NOT selected. This is expected, and the operator may select a peripheral rod at this time.* *May also get Alarm HEATER TROUBLE, 650-135 alarm. This is expected at this power level.*
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.: 12-4**	**Event No.: 2**	Page 3 of 27
Event Description:	Remove 2A RFPT from service and leave wind milling.		

Time	Position	Applicant's Actions or Behavior
		*SIMULATOR OPERATOR, **Event 2** and **Event 3** can be run simultaneously. PROCEED to **Event 3** when RFPT 2B is controlling RWL.*
10 Mins	SRO	• Directs the BOP to remove the 2A RFPT from service IAW 34SO-N21-007-2, Section 7.2.1.
	BOP	• Confirms Feedwater Flow is less than 7 Mlbm / hr. • Confirms RFPT 2A AND RFPT 2B are in Automatic control on 2C32-R600, Master Controller. • Depresses setpoint increase button on 2C32-R600, Master Controller and raises RWL setpoint to 39 inches. • Places 2C32-R601A, RFP A M/A Station, in Manual, by depressing the 'M' pushbutton until it illuminates, panel 2H11-P603. • Slowly decreases RFPT 2A speed until RFP 2B is controlling reactor vessel level. ***(See Event 3)*** • RFP C005A DISCH LOW FLOW, (656-039) will alarm and is expected. • Depresses setpoint decrease button on 2C32-R600, Master Controller and lowers RWL setpoint to 37 inches. • Slowly decreases RFPT 2A speed until no speed decrease is observed and places RFPT A TMR switch to SS and confirms SPEED SETTER yellow light illuminates. • Slowly lowers RFPT 2A Speed Setter switch until RFPT speed is at 1000 rpm, at 2H11-P650. • Dispatches SO to confirm open OR open RFPT 2A drain valves on Local panel 2H21-P244 (steps 7.2.1.1.9). • Slowly lowers RFPT 2A Speed Setter switch to MINIMUM to allow the RFPT to windmill, at 2H11-P650.
		Simulator Operator, if dispatched to confirm RFPT 2A drains, after 5 minutes, report all drain valves per step 7.2.1.1.9 are open.
		Simulator Operator, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.: 12-4**	**Event No.: 3**	Page 4 of 27
Event Description:	The Backup SDV valves will close due to a small air leak on 2C11-F040 requiring the SRO declare a TS Required Action Statement.		

Time	Position	Applicant's Actions or Behavior
10 Min		*Simulator Operator, at the Chief Examiner's direction, ENTERS (**RB-3**) rfC11_141, SDV Outboard Valves close* *AND* *3 minutes later ENSURES Event Trigger **EGC11-4** ACTIVATES mf60311307, SDV Not Drained, alarm.*
	ALL	• When the SDV NOT DRAINED, (603-119), alarm is received, recognizes that the SDV Outboard Valves have closed. (May recognize prior to alarm by scanning the control boards).
	ATC	• Enters 603-119 and performs the following: • Determines that 2C11-F035A, 2C11-F035B and 2C11-F037 have closed. • Determines status of all Scram Valves (blue lights are NOT lit) on P603 display. • Determines status of SCRAM VLV PILOT AIR HDR PRESS HIGH/LOW, (603-131), (NOT LIT) • Determines if any Rod Drift lights on P603 (None). • Confirms Scram Disch Vol Isol Test Switch in Normal. • Dispatches SO to the CRD drives to check for leaking Scram Outlet Valves. • Dispatches SO/Maintenance to determine if an air leak exists on the SDV valve piping.
		SIMULATOR OPERATOR, when dispatched to investigate, wait 2 minutes and report there is a small air leak on 2C11-F040 and will have to be repaired. It will take approximately 2 hours to repair.
	SRO	• Enters Tech Spec 3.1.8 Condition A which requires the SDV line to be isolated within 7 days. • May inform Maintenance to correct the associated air leak.
		Simulator Operator, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	Scenario No.: 12-4	Event No.: 4	Page 5 of 27

Event Description: UAT 2B Hi temperature / swap house loads / remove from service.

Time	Position	Applicant's Actions or Behavior
15 Min		*SIMULATOR OPERATOR at Lead Examiner's direction, ACTIVATE: (**RB-4**)* • *mf65111604, Unit Aux Xfmr "2B" Misc Alarm (Annunciator On) svoN40260, UAT 2B Winding temp, final of 230, ramp 100* *THEN, 2 minutes later ACTIVATE: (**RB-1**)* • *mf65111605, Unit Aux Xfmr "2B" Winding Temp High (Annunciator On)*
	ALL	UNIT AUX XMFR 2B MISC ALARM, (651-116), annunciates Two minutes later, UNIT AUX XMFR 2B WINDING TEMP HIGH, (651-117) annunciates.
	ATC	• Responds to alarm UNIT AUX XMFR 2B MISC ALARM, (651-116) • Notifies GCC of the alarm. • Dispatches an operator to check the transformer local panel in the Low Voltage Switchyard, 2H21-P214. • Responds to alarm UNIT AUX XMFR 2B WINDING TEMP HIGH, (651-117). • Notifies the SRO that per the ARPs Rx Power will need to be reduced if the winding temperature is increasing and to Transfer the loads to Startup Transformer (SUT) 2C, if the oil temperature is high.

Op-Test No.: 2019-301	**Scenario No.:** 12-4	**Event No.:** 4	Page 6 of 27
Event Description:	UAT 2B Hi temperature / swap house loads / remove from service.		

Time	Position	Applicant's Actions or Behavior
		SIMULATOR OPERATOR: • *3 minutes from being dispatched, call the control room as the operator dispatched to the Unit 2B UAT and report that the 2B UAT oil temperature is 93°C and that the winding temperature is 106°C and both are slowly increasing.* *If asked, Transformer fans and oil pumps are running.* • *DO NOT PROMPT TO TRANSFER LOADS* • *If more updates of temperature are required, increase both temps 1°C/min EACH UPDATE, until load is transferred.* • *Temps will eventually stabilize above the setpoints.* *When the UAT is unloaded, temps will slowly decrease, however the afore mentioned alarms will NOT clear until locally reset.*
	SRO	• Directs ATC operator to enter 34SO-R22-001-2 for transferring 4160VAC buses from Unit Aux Transformer (UAT) 2B to Start-Up transformer (SUT) 2C.
	ATC	• Enters 34SO-R22-001-2, 4160 VAC System.
	ATC	Swapping of 2A 4160VAC from the UAT to the SAT. • Confirms power is available to Startup Aux XFmr 2C as indicated by the potential lights on panel 2H11-P651. • Confirms OPEN ACBs 135544, 135564 and 135584 (2H11-P652).
	ATC	• Places 135434/135454 Station Svc Interlock Cutout switch in OFF-(DOWN). • Places Sync Switch (SSW) ACB 135454 in ON. • Confirms the sources of power to 4160V Bus 2A are synchronized and voltage is normal on Start-Up Aux Transformer 2C.

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 4		Page 7 of 27
Event Description: UAT 2B Hi temperature / swap house loads / remove from service.		
Time	**Position**	**Applicant's Actions or Behavior**
	ATC	• Closes ACB 135454, 4160V Bus 2A Alternate Supply, AND confirms that current increases from Startup Auxiliary Transformer 2C. • Trips ACB 135434, 4160V Bus 2A Normal Supply. • Places Sync Switch (SSW) ACB 135454 in OFF. • Places 135434/135454 Station Svc Interlock Cutout switch in NORMAL-(UP).
	ATC	Swapping of 2B 4160VAC from the UAT to the SUT • Confirms power is available to Startup Aux Transformer 2C as indicated by the potential lights on panel 2H11-P651. • Confirms OPEN ACBs 135544, 135564 and 135584 (2H11-P652).
		• Places 135444/135464 Station Svc Interlock Cutout switch in OFF-(DOWN). • Places Sync Switch (SSW) ACB 135464 in ON. • Confirms the sources of power to 4160V Bus 2B are synchronized and voltage is normal on Start-Up Aux Transformer 2C.
	ATC	• Closes ACB 135464, 4160V Bus 2B Alternate Supply, AND confirms that current increases from Startup Auxiliary Transformer 2C. • Trips ACB 135444, 4160V Bus 2B Normal Supply. • Places Sync Switch (SSW) ACB 135464 in OFF. • Places 135444/135464 Station Svc Interlock Cutout switch in NORMAL-(UP). • Notifies the SRO that 4160 VAC 2A and 2B buses have been transferred from the UAT to SUT 2C.
		SIMULATOR OPERATOR, after UAT 2B is removed from service, MODIFIES Override svoN40260 to a Final of 125 with a ramp rate of 5.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	Scenario No.: 12-4	Event No.: 5	Page 8 of 27

Event Description: Small leak on the "A" FW line in the DW requiring SBGT to vent DW.

Time	Position	Applicant's Actions or Behavior
10 Mins		*Simulator Operator, at the direction of the lead examiner, ENTERS: (**RB-5**) malfunction mfB21_229A final value of 0.05 and ramp of 1000.*
	ALL	• Receives Annunciators: • PRIMARY CNMT PRESSURE HIGH, (603-115) • MULTIPOINT TEMPERATURE RCDR 2T47-R626 TEMP HIGH, (657-025)
	SRO	• Directs the BOP to: • Enter 657-025 ARP. • Monitor Drywell pressure. • Vent the DW with SBGT, when DW pressure approaches 0.65 psig. • Enter 34AB-T23-002-2; Small Pipe Break Inside Primary Containment (may give this to the ATC since BOP will be at back panel). • Directs Operator Check DW Leakage per 34SV-SUV-019-2.
		NOTE: *The BOP will use either (A or B) train of SBGT per 34SO-T46-001-2 SBGT System procedure or uses placard.*
	BOP (Placard)	• Opens 2T46-F001 (A or B) or 2T46-F003 (A or B) for the subsequent train. • Places SBGT Fan (2A or 2B) control switch to "RUN." • Receives (2B or 2A) SBGT SWITCH NOT IN AUTO, (657-091 or 654-076), alarm • Confirms 2T46-F002 (A or B) OPENS • Confirms SBGT Heater red light illuminates.

Op-Test No.: 2019-301	Scenario No.: 12-4	Event No.: 5	

Event Description: Small leak on the "A" FW line in the DW requiring SBGT to vent DW.

Time	Position	Applicant's Actions or Behavior
	BOP (Placard)	• Opens 2T48-F334A or 2T48-F334B (both valves may be opened) • Receives alarm DW VENT EXH BYPASS VLV OPEN, (657-008) or (654-002) • Receives alarm DRWL/TORUS N2 M/U 2 INCH ISOL VALVES OPEN, (657-042) or (654-035) • Opens 2T48-F335A or 2T48-F335B (both valves may be opened) • Opens 2T48-F336A or 2T48-F336B (both valves may be opened) • Monitors DW pressure • Notifies SRO that venting of the Drywell is in progress.
	BOP/ATC	• If directed, enters 34SO-T48-002-2, to Fast Vent and confirms the following alarms are NOT illuminated:
		• SBGT/DRYWELL AND TORUS RADIATION HIGH (601-402) • FISSION PRODUCT PARTIC RADN HIGH/INOP (602-406) • FISSION PRODUCT IODINE RADN HIGH/INOP (602-412) • FISSION PRODUCT GAS HIGH/INOP (602-418) • CONTAINMENT RADIATION HIGH/INOP (602-436)
		• Opens 2T48-F319, Drywell Vent Vlv (2H11-P602). • Opens 2T48-F320, Drywell Vent Vlv (2H11-P601). • When Drywell pressure is < 0.5 psig on 2T48-R607A OR 2T48-R607B, close 2T48-F320, Drywell Vent Vlv. • Closes 2T48-F319, Drywell Vent Vlv.

Op-Test No.: 2019-301 Scenario No.: 12-4 Event No.: 5		Page 10 of 27
Event Description:	Small leak on the "A" FW line in the DW requiring SBGT to vent DW.	

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	• Enters 34AB-T23-002-2 and attempts to identify the location of the pipe break including: ◦ Instrumentation lines ◦ RWCU (may remove from service and isolate by: tripping RWCU 2B closing 2G31-F001 and/or closing 2G31-F004) ◦ Recirc Pump seals ◦ HPCI ◦ RCIC ◦ SRV Tailpipe Vacuum Breakers malfunctioning ◦ Feedwater line break indication ◦ Notifies SSS to perform 34SV-SUV-019-2, DW Leakage check.
		Simulator Operator; WAIT 3 minutes from being dispatched to perform DW leakage check, *As the operator checking DW leakage, report:* • *DW Equipment drain leakage is stable at 1.7 gpm* • *DW Floor drain leakage has increased from 0.8 gpm to 6.1 gpm*
	SRO	• Enters Tech Specs: • 3.4.4 RCS Operational Leakage ◦ **Condition: 3.4.4.A,** Unidentified leakage not within limit OR total leakage not within limit. **Required Action:** Reduce leakage to within limits. **Completion time:** 4 hours. ◦ **Condition 3.4.4.B**, Unidentified leakage increase not within limit. **Required Action:** Reduce leakage increase to within limits. **Completion time:** 4 hours.
		Simulator Operator, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 6

Event Description: CRD Flow Controller fails in Auto requiring manual operation to re-establish CRD flow.

Time	Position	Applicant's Actions or Behavior
10 Min		*At the Chief Examiner's direction, Simulator Operator ENTERS (**RB-6**), mfC11_299.*
	ATC	• Receives CRD HYD TEMP HIGH, (603-140) alarm. • Determines that the CRD Flow Control Valve A has closed. • Determines 2C11-R600, CRD Flow Controller, output is at minimum and has failed downscale. • Notifies SRO that the CRD Flow Controller has failed downscale. • Notifies I & C (if SRO does NOT) to investigate 2C11-R600.
		***NOTE**: The ATC may immediately place the controller in manual IAW 31GO-OPS-021-0, Manipulation and Control of Equipment OR NMP-OS-007-001, Conduct of Operations Standards and Expectations, responding to a failed controller.*

	ATC	• Enters:
		  • CRD HYD TEMP HIGH, (603-140).
		  • 34AB-C11-001-2, Loss Of CRD System.
		
		• IAW 31GO-OPS-021-0,
		Places 2C11-R600 controller in Manual.
		• Increases output of controller until CRD flow is approximately 50 gpm.

	SRO	• Dispatches I & C to investigate 2C11-R600. • Dispatches a SO to monitor CRD drive temperatures. • Directs operator to perform actions of the ARP and 34AB-C11-001-2.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 7

Event Description: Hi Rad on SBGT train requiring swapping to other SBGT.

Time	Position	Applicant's Actions or Behavior
10 Mins		*SIMULATOR OPERATOR, at the direction of the Chief Examiner, ENTERS: (**RB-7**) SVOs - svoD11094 D11-K613A STBY GAS TREATMENT EXH RAD MONITOR A OR svoD11095 D11-K613B STBY GAS TREATMENT EXH RAD MONITOR B (f:100 r:25).* *THE MALFUNCTION WILL BE DECIDED BY WHICH SBGT FAN IS FIRST STARTED USING **EGT46-17** & **EGT46-18**.*
	ALL	• Alarm received: • SBGT/DRYWELL AND TORUS RADIATION HIGH, (601-402)
		NOTE: *The operator may start either 2A or 2B SBGT Train. The following steps are written assuming 2A Train is used. If 2B Train is used, substitute 2B for 2A for valves and the alarm numbers in parenthesis.*

	BOP	• Enters 601-402
		  • Confirms 2D11-K613A (B), SBGT Discharge Rad Monitor, Radiation has exceeded its alarm setpoint as indicated on 2D11-K613A (B) on 2H11-P606
		  • Notifies SRO of high radiation on SBGT 2A (2B)
		  • Since radiation is high and continued SBGT operation is required, determines SBGT 2B (2A) fan is required to be started and 2A (2B) needs to be secured. (SRO may direct)
		  • Enters 34SO-T46-001-2, Standby Gas Treatment System, procedure or uses placard at the 2H11-P654 (2H11-P657) panel to start SBGT 2B (2A)
		    • Opens 2T46-F001B (1A) or 2T46-F003B (3A)
		    • Places 2B (2A) SBGT Fan control switch to RUN
		    • Alarm 2B (2A) SBGT SWITCH NOT IN AUTO, 654-076, (657-091) is received
		    • Confirms 2T46-F002B (2A) OPENS
		    • Confirms SBGT 2B (2A) Heater red light illuminates.

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 7		Page 13 of 27
Event Description: Hi Rad on SBGT train requiring swapping to other SBGT.		
Time	**Position**	**Applicant's Actions or Behavior**
		NOTE: *2D11-K613A/B will continue to rise until it is upscale. When 2A/ 2B SBGT Train is swapped, the new SBGT train in service will experience normal radiation levels with the crew concluding the previous operating train radiation instrument has failed internally.*
	BOP	• Secures SBGT 2A (2B) • Confirms SBGT AUTO SIGNAL PRESENT, 657-019 annunciator is RESET • Places SBGT 2A (2B) in the AUTO position • Depresses SBGT A (B) Fan/Htr Auto-Start Reset pushbutton • Confirms Green HTR OFF light illuminates • Confirms 2T46-F002A (2B) closes • Confirms closed OR close 2T46-F003A (3B) • Confirms closed OR close 2T46-F001A (1B) • Confirms that annunciator P657-093 (P654-078) is NOT in the alarm condition • As time permits, refers to 34SO-T46-001-2 AND places SBGT in Standby per subsection 7.1, Standby - Ready For Auto Start
	SRO	Based on the alarm received and indications, • Directs BOP to swap SBGT fans. • Notifies Maintenance of failed radiation instrument 2D11-K613A/B • May enter TRM and determines 2D11-K613A/B is not a TS required instrument.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: **2019-301** **Scenario No.:** **12-4** **Event No.:** **8**

Event Description: Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.

Time	Position	Applicant's Actions or Behavior
10 Mins		*SIMULATOR OPERATOR, at Chief Examiners direction, MODIFY malfunction mfB21_229A to Final value of **60** with ramp of **1000**. When the Mode switch is placed to SHUTDOWN, ENSURE Event Trigger **EGC71-4** inserts the following:* *mfN61_73, Main Condenser In-leakage to 100%,* *mfG31_242 RWCU Unisolable leak in the Drywell,* *override diC11B-S4A to NORMAL,* *override diC11B-SBA to NORMAL.*
	ALL	• Recognizes rapidly increasing Containment Pressure from the following alarms: • PRIMARY CNMT HIGH PRESSURE TRIP, (603-106) • PRIMARY CNMT PRESSURE HIGH, (603-115) • DRYWELL PRESSURE HIGH, (602-210)
	SRO	• Directs ATC to perform RC-1 placard • Directs BOP to perform RC-2 & RC-3 placards • Enters RC & PC EOP Flowchart • Enters CP-1 when a loss of all high-pressure feed systems occurs
	ATC (Placard)	• Performs RC-1 consisting of: • Inserts a manual scram using the SCRAM pushbuttons • Places the mode switch to SHUTDOWN. • Confirms all rods are inserted by observing full in lights, SPDS, or the RWM display. • Informs the SRO that all rods are fully inserted. • Places SDV isolation valve switch to "isolate" & confirms closed. • If NOT tripped, places the Recirc pumps at minimum speed. • Inserts SRMs and IRMs. • Shifts recorders to read IRMS, when required. • Ranges IRMS to bring reading on scale. • Notifies SRO when RC-1 complete.

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8		Page 15 of 27
Event Description:	Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.	

Time	Position	Applicant's Actions or Behavior
		NOTE: __IF__ "A" FW Line break has __NOT__ been discovered, the BOP will perform the following RC-2 actions.

	BOP	• Performs RC-2 actions consisting of:
		• Confirms proper Level Control response:
		  • Checks ECCS Injection Systems and secure as necessary.
		    • If NOT running, places 2E41-C002-3, HPCI Aux Oil Pump, in Pull-To-Lock
		  • Ensures FW Master Controller setpoint reduces to 9 inches and output reduces to 25% of previous value.
		• IF set down does NOT auto function, then manually reduces FW Master Controller setpoint to approximately 9 inches.
		• When feed flow is less than the capacity of the S/U level control valve (≈ 1.5 mlbm/hr), then:
		  • Opens 2N21-F125.
		  • Confirms/places 2C32-R619, FW S/U level control valve controller, in Auto, set at approximately 9 inches.
		  • Closes 2N21-F110.
		• May attempt maximize CRD flow IAW 34SO-C11-005-2
		• May attempt to restart the CRD pumps (***neither pump will restart***)
		• Attempts to control RWL with the RCIC System.
		• Notifies SRO if RWL gets outside assigned band.

		SIMULATOR OPERATOR, the malfunction for this event was in at the beginning of the scenario (diN21-F006A Final Value of OPEN).
	BOP	• Discovers "A" FW line break • Notifies SRO of "A" FW line break and closes 2N21-F006A, "A" FW Isolation valve on P603 panel • Notifies SRO that 2N21-F006A will not close • Closes 2N21-F110 • Closes 2N21-F125

Op-Test No.: 2019-301 Scenario No.: 12-4 Event No.: 8		
Event Description:	Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.	

Time	Position	Applicant's Actions or Behavior

	BOP	**IF** HPCI pumping out of the "A" FW Line break has **NOT** been discovered:
		• Adjusts 2E41-R612, HPCI Flow Control, to desired injection rate
		• Transfers 2E41-R612 controller to manual and adjust its speed demand output to obtain the desired pump flow
		
		IF HPCI pumping out of the "A" FW Line break **HAS** been discovered:
		• Shuts down HPCI by:
		  • Depresses and holds the HPCI Turbine Trip pushbutton
		  • When HPCI turbine has stopped, places 2E41-C002-3, HPCI Aux Oil Pump, in Pull-To-Lock
		  • When HPCI TURBINE BRG OIL PRESS LOW, (601-112), alarm is received, releases the HPCI Turbine Trip push-button.

		*The malfunction for this event was in at the beginning of the scenario (mfE51_61, RCIC Overspeed). Event Trigger **EGE51-3** will trip RCIC when speed is ~ 2500 rpm.*

	BOP	• Attempts to manually start RCIC, if it has NOT auto started:
		  • Depresses RCIC Manual Initiation P/B
		  • Confirms 2E51-F046 opens
		  • Confirms Barom Cndsr Vac Pump started
		  • Confirms 2E51-F045 opens
		  • Confirms 2E51-F013 opens
		  • Observes rpm increasing and then RCIC tripping

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8		
Event Description:	Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.	

Time	Position	Applicant's Actions or Behavior
		Simulator Operator, if dispatched to RCIC, wait 4 minutes and INFORM the BOP/SRO that the RCIC Overspeed trip will NOT be reset because the linkage is disconnected and laying on the floor. If requested, INFORM operator you will notify Maintenance.

	BOP	• Recognize that RCIC tripped and responds to annunciator RCIC TURBINE TRIP, (602-301).
		  • Confirms RCIC Turbine Tripped per the following indications:
		    • 2E51-F524, Trip & Throttle Valve, indicates closed.
		    • Turbine Speed decreasing
		    • 2E52-F013, Pump Discharge Valve, indicates closed.
		    • 2E51-F019, Min Flow Valve, indicates closed.
		  • Recognizes that the 2E51-F524, Trip & Throttle Valve actuator will NOT run down and determines that RCIC has tripped on Overspeed.
		  • Dispatches SO to locally reset RCIC Overspeed condition.
		  • Notifies SRO of RCIC status and when RWL gets outside assigned band.

	BOP	If directed, attempts to maximize injection from CRD. (**Will NOT work**)

	ATC/BOP	• If directed, places SBLC switch to either Start A or Start B
		• CONFIRMS the following:
		  • 1106A and 1106B, Squib Vlv Ready, Indicating Lights, EXTINGUISHED
		  • SBLC LOSS OF CONTINUITY TO SQUIB VALVE (603-152) annunciator ALARMED
		  • Selected 2C41-C001A or 2C41-C001B, SBLC Pump, has STARTED
		  • CONFIRM or CLOSE 2G31-F004, Rx Water Cleanup Vlv, panel 2H11-P601
		  • Notifies SRO SBLC is injecting

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8

Event Description: Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.

Time	Position	Applicant's Actions or Behavior
	BOP	• Performs RC-3 consisting of: • Monitor RPV pressure. • Confirm proper operation of pressure control system (TBV, LLS, etc.). • Maintain RPV pressure between 1074 and 800 psig. • Notify SRO of pressure control system operation. ***NOTE*:** *When RWL drops below -101 inches OR Main Condenser Vacuum decreases to 10 inches Mercury Vacuum, the MSIVs will close requiring the following actions to take place.* • Confirms all MSIVs close at -101 inches, if NOT previously closed and places all MSIV switches to close (2B21-F022A-D & 2B21-F028A-D. • If necessary, allow RPV pressure to exceed 1074 psig then cycles any SRV to initiate LLS. • Confirms LLS valves operate as required • Monitors RPV water level as it trends down. • Informs the SRO of water level reaching –155."
	SRO	• Per RC/L • Order BOP to Inhibit ADS • Orders BOP to start ALL RHR & Core Spray pumps. • Orders all available Table 6 systems injecting until water level raises above –155". • Orders SBLC injection. • As time permits, directs Torus Cooling to be placed in service.
	SRO	• Per the PC flowchart, verifies torus level is <285 inches and may direct ATC to spray the Torus if RHR is NOT needed for adequate core cooling.

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8

Event Description: Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.

Time	Position	Applicant's Actions or Behavior
	ATC	• Re-opens 2P41-F316s due to high temp on the Condensate Pumps/Booster pumps per 34AB-P41-001-2, Loss of PSW, Placard OR as directed by the SRO. • Places the "A" and "B" Isolation Override switches on the 2H11-P652 panel to Override • Fully opens 2P41-F316A or C and 2P41-F316B or D • Throttles 2P41-F316C or A and 2P41-F316D or B to open while monitoring PSW division 1 and 2 pressure on 2H11-P650 panel ensuring that PSW pressure remains above 80 psig.
	ATC	• Sprays the Torus per 34SO-E11-010-2 placard on the 2H11-P601 Panel as follows: • Places Cnmt Spray Vlv Cntl switch in the MANUAL position. • Starts RHR pump(s) in loop A (B), if NOT already running. • Opens 2E11-F028A or B • Opens 2E11-F027A or B • Throttles Open 2E11-F027A or B • Notifies SRO that RHR is in Torus Sprays
	SRO	• Per the PC flowchart, may direct ATC to spray the Drywell if RHR is NOT needed for adequate core cooling. • Confirms Torus pressure > 11 psig, verifies that Torus Level is <215 inches, in the safe area of Graph 8 (DWSIL) and then directs an operator to: • Place the DW cooling fans to Off • Shutdown Recirc pumps (if running) • Spray the DW • May direct the operator to secure DW sprays & Torus sprays when pressure is <1 psig in the respective areas

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8

Event Description: Leak on the “A” FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.

Time	Position	Applicant's Actions or Behavior

	ATC	• If directed to spray the Drywell, places BOTH Recirc pumps to PTL Off on panel 2H11-P602.
		• Places the following DW cooling fans control switches in the OFF position.
		  • 2H11-P654:
		    • 2T47-B007B
		    • 2T47-B008B
		    • 2T47-B009B
		    • 2T47-B010B
		    • 2T47-C001B
		    • 2T47-C002B

	ATC	• 2H11-P657:
		  • 2T47-B007A
		  • 2T47-B008A
		  • 2T47-B009A
		  • 2T47-B010A
		  • 2T47-C001A
		  • 2T47-C002A

	ATC	• Sprays the Drywell using 34SO-E11-010-2 placard at P601 panel.
		  • Places Cnmt Spray (A or B) Vlv Cntl switch in the MANUAL position.
		  • Starts RHR pump(s) in loop A (B), if NOT already running.
		  • Opens 2E11-F021A or B
		  • Opens 2E11-F016A or B and establishes flow > 5000 gpm on 2E11-R608A or B.
		  • When directed, closes 2E11-F016A or B
		  • Closes 2E11-F021A or B
		  • Notifies SRO that DW spraying the Drywell is complete

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8 Page 21 of 27

Event Description: Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.

Time	Position	Applicant's Actions or Behavior
		NOTE: *The operator may place Torus Cooling in service by using the Placard that's available or using the appropriate section of the procedure. These steps assume the Placard is used. The A and/or B loop of RHR may be used depending on Torus temperature. The following steps are written assuming "B" loop and "B" pump is used. If/When "A" loop is used, substitute "A" for "B" for valves and if "B" pump is NOT used substitute "A", "C", or "D" for "B" pump.*

	ATC	• Enters 34SO-E11-010-2, Residual Heat Removal
		  • Places RHRSW in service
		    • Overrides 2E11-F068B (A) Low Discharge Pressure Interlock
		    • Positions 2E11-F068B (A) to 45% OPEN
		    • Starts RHRSW pump B (A)
		    • Places 2E11-F068B (A) Low Discharge Pressure Interlock switch to normal position.
		    • Positions 2E11-F068B (A) to obtain < 4400 gpm AND < 450 psig

	ATC	• IF desired to start a SECOND RHRSW pump,
		  • Throttles 2E11-F068B (A) to achieve max flow rate (NOT to exceed 4400 GPM).
		  • Opens 2E11-F068B (A) an additional 5%.
		  • Starts second RHRSW Pump.
		  • Positions 2E11-F068B (A) to obtain < 8800 gpm AND < 450 psig

Op-Test No.: 2019-301 **Scenario No.:** 12-4 **Event No.:** 8

Event Description: Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.

Time	Position	Applicant's Actions or Behavior
	ATC	• Places RHR B (A) Loop in Torus cooling per the placard by performing the following steps: • Opens 2E11-F048B (A) • Closes 2E11-F047B (A). • Opens 2E11-F003B (A). • Starts RHR Loop B (A) pump (if NOT already running) • Opens 2E11-F028B (A) • Receives annunciator AUTO BLOWDOWN CS OR RHR PRESS, (602-312) • Receives annunciator SEC SYSTEM AUTO INITIATION SIGNAL PRESENT, (650-234) • Throttles OPEN 2E11-F024B (A) • Opens 2E11-F047B (A) • Ensures RHR flow is < 11,500 GPM, THEN Closes 2E11-F048B • Notifies the SRO that RHR "B" (A) loop is in service • May place the second pump in service (if NOT already running).
	SRO	• Directs H_2/O_2 Analyzers placed in service IAW 34SO-P33-001-2.
	ATC	• Places H_2/O_2 Analyzers in service IAW 34SO-P33-001-2 • Confirms closed 2P33 F605, Panel Inlet from Torus • Places 2P33 S16, LOCA Override, H_2/O_2 Analyzer Outbd Isol Vlvs to Bypass • Places 2P33 S17, LOCA Override, H_2/O_2 Analyzer Inbd Isol Vlvs to Bypass • Confirms the H_2/O_2 Analyzer Running red light for the A & B train are illuminated • If either train red light does NOT illuminate, depresses Channel A or Channel B Reset pushbuttons on 2H11-P700 panel. • Confirms analyzers are running. • Notifies SRO H_2/O_2 Analyzers are running.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-4 Event No.: 9	Page 23 of 27
Event Description: Emergency Depress on low RWL.	

Time	Position	Applicant's Actions or Behavior
	SRO	IAW RC/L • Order BOP to Inhibit ADS (if NOT previously done) • Orders BOP to start ALL RHR & Core Spray pumps (if NOT previously done) • Orders Emergency Depressurization once water level decreases below –155" and prior to –180". • Orders all available Table L6 systems injecting until water level raises above –155". • Orders SBLC injection (if NOT previously done). • As time permits, directs Torus Cooling to be placed in service (if NOT previously done) IAW PC.
	BOP	• Verifies ALL RHR & Core Spray pumps (P601) are running or starts by placing switches to start IAW placard.
	ATC/BOP	• Places SBLC switch to either Start A or Start B • CONFIRM the following: • 1106A and 1106B, Squib Vlv Ready, Indicating Lights, EXTINGUISHED • SBLC LOSS OF CONTINUITY TO SQUIB VALVE (603-152) annunciator ALARMED • Selected 2C41-C001A or 2C41-C001B, SBLC Pump, has STARTED • CONFIRM or CLOSE 2G31-F004, Rx Water Cleanup Vlv, panel 2H11-P601 • Notifies SRO SBLC is injecting
	ATC	• Opens 7 ADS valves prior to RWL reaching -180" by: (**Critical Task**) (*Critical task is met when at least 5 SRVs have been opened before RWL lowers to -180 inches.*) • Placing switches for the ADS valves to OPEN. • Confirms ALL ADS valve red lights illuminate. • Confirms ALL ADS valve yellow lights illuminate. • Confirms Reactor pressure is decreasing. • Notifies the SRO that ALL ADS valves are open.
		SIMULATOR OPERATOR the next event was inserted at the beginning of the scenario.

Op-Test No.: 2019-301 Scenario No.: 12-4 Event No.: 10

Event Description: Failure of RHR & CS injection valves to auto open on LOCA signal. Manual works ONLY for CS F005A & F005B. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
		NOTE: *RHR and Core Spray pump valve failures were inserted from the beginning.*
	BOP	• Verifies ALL RHR & Core Spray pumps (P601) are running or starts by placing switches to start IAW placard. • Notifies SRO of RHR & Core Spray pump have auto started.
		SIMULATOR OPERATOR ENSURES Event Trigger ***EGE21-4 & EGE21-5*** *deletes overrides for CS F005A & F005B, when required.*
	BOP	When RPV pressure decreases to <425 psig, performs the following: • Confirms CS discharge pressure >265 psig • Confirms 2E21-F031A (B) closes when flow >950 gpm • As time allows, confirms a CS/RHR room cooler automatically starts • Confirms open 2E21-F005A (B) • Notifies SRO of Core Spray valve failures and opens 2E21-F005A (B) • Throttles 2E21-F005A and\or F005B to restore RWL to +5 to 50 inches (**Critical Task**) *(Critical Task is met if at least one Core Spray pump obtains injection within 3 minutes of RPV pressure dropping below 284 psig.)*
	BOP	When RPV pressure decreases to <425 psig, performs the following: • Confirms 2E11-F007A (B) closes when flow >1945 gpm • Confirms open 2E11-F015A and/or 2E11-F015B, RHR Inbd Inj Vlv • Attempts to open 2E11-F015A (B). • Notifies SRO of RHR valve failures. • Confirms open 2E11-F048A (B), Hx Bypass Vlv • When RPV pressure is < 370 PSIG, confirms closed/close 2B31-F031A (2B31-F031B), Reactor Recirc A(B) Pump Disch Vlv.
		At Chief Examiner's direction, the scenario should be terminated when RWL is being restored with available low-pressure systems.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-4** **Op-Test No.:** **2019-301**

Examiners: ____________ **Operators:** ____________ **SRO**

____________ ____________ **RO**

____________ ____________ **BOP**

Initiating Conditions:	Unit 2 is operating at 63% RTP preparing to remove 2A RFPT from service for maintenance activities. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Turnover	Reduce reactor power to 60% RTP for RFPT 2A removal. Leave RFPT 2A operating at ~1000 RPM until Maintenance requests a Danger tag out.

Summary:

- **Event 1:** Reactivity: The ATC will reduce reactor power to ~60% RTP via Recirc to achieve <7 mlbm/hr for 2A RFPT removal from service.
- **Event 2:** Normal; After reactor power is reduced, the BOP will remove the 2A RFPT from service and leave rotating at approximately 1000 rpm.
- **Event 3:** TS; The Backup SDV valves will close due to a small air leak on 2C11-F040 requiring the SRO declare a TS Required Action Statement.
- **Event 4:** Component; UAT 2B will experience a Hi temperature requiring the removal from service.
- **Event 5:** Component/TS; Small Feedwater line leak causes DW pressure to increase. The team will receive a P603 alarm that will direct DW venting to be placed in service. The BOP operator will start Standby Gas Treatment (SBGT) and DW venting will be aligned. The SRO will declare a TS Required Action Statement.
- **Event 6:** Component; CRD Flow Controller fails closed causing a loss of normal CRD flow. The ATC will place the controller in manual and restore CRD flow.
- **Event 7:** Instrument; The operating train of SBGT will experience a indicated Hi Rad condition requiring the BOP to swap to the other SBGT train.
- **Event 8:** Major; Leak on the "A" FW line in the DW worsens/ruptures resulting in the crew inputting a reactor scram.
- **Event 9:** Major; Loss of High Pressure Feed requiring an Emergency Depress on low RWL with a small leak in DW. Emergency Depress before -180" RWL. (**Critical Task**)
- **Event 10:** Component; RHR and Core Spray injection valves fail to open on a LOCA signal requiring manual actions for CS to inject. (**Critical Task**)

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-4** **Op-Test No.:** **2019-301**

Critical Tasks

- With RPV Pressure greater than the shutoff head of the available low-pressure injection systems, and when RWL decreases to -155 inches, initiate an Emergency Depress. At least 5 SRVs are required to be open before RWL decreases to -180 inches. **(Event 9)**

- At least one Core Spray pump obtains injection within 3 minutes of RPV pressure dropping below 284 psig. **(Event 10)**

	ES 301-4 Attributes	Required	Actual	Items
1.	Total Malfunctions	5-8	7	1. UAT 2B Hi temperature **(Event 4)** 2. FW leak/start SBGT **(Event 5)** 3. CRD Flow Controller fails closed **(Event 6)** 4. Hi Rad on SBGT train **(Event 7)** 5. FW line ruptures with DW leak/scram **(Event 8)** 6. Loss of HP feed **(Event 9)** 7. RHR/CS failure (**Event 10)**
2.	Malfunctions After EOP Entry	1-2	1	1. RHR/CS failure (**Event 10)**
3.	Abnormal Events	2-4	3	1. FW leak/start SBGT **(Event 5)** 2. CRD Flow Controller fails closed **(Event 6)** 3. Hi Rad on SBGT train **(Event 7)**
4.	Major Transients	1-2	2	1. FW line ruptures with DW leak/scram **(Event 8)** 2. Loss of HP feed **(Event 9)**
5.	EOPs entered, requiring substantive actions	1-2	2	1. RC-(Non-ATWS) 2. PC
6.	EOPs contingencies entered with substantive actions	0-2	1	1. CP-1
7.	Preidentified Critical Tasks	≥ 2	2	1. Loss of HP feed **(Event 9)** 2. RHR/CS failure (**Event 10)**

ILT 12 NRC DRAFT Scenario 4

SHIFT TURNOVER

target ZERO Every day, every job, safely.	**Safety Focus**
UNIT 1 STATUS	
Plant Conditions:	• Unit 1 is operating at 100% power • Activities in progress: Maintaining Rated Thermal Power
Plant Conditions:	• Unit 2 is operating at 63% RTP preparing to remove 2A RFPT from service for maintenance activities. • 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Protected Train: ☒ Division I ☐ Division II	**EOOS:** ☒ Green ☐ Orange ☐ Yellow ☐ Red
Scheduled evolutions:	☐ Reduce reactor power to 60% RTP for RFPT 2A removal. Leave RFPT 2A wind milling until Maintenance requests a Danger tag out.
Surveillances due this shift:	☐ NONE
Inop Equipment:	☐ 2D11-K615B, Off gas Post Treatment Radiation monitor has failed Downscale. IAW TS/TRM, I&C has placed 2D11-K615B in the trip condition while maintaining the function of 602-405, Post Treatment O/G Radiation Hi-Hi-Hi/Inop. A Caution Tag is attached to 2D11-K615B switch.
Active tagouts:	☐ NONE
Rod Configuration:	☐ See RWM Step 24

NRC DRAFT

Facility: E. I Hatch **Scenario No.:** 12-5 **Op-Test No.:** 2019-301

Examiners: ____________ **Operators:** ____________ **SRO**

____________ ____________ **RO**

____________ ____________ **BOP**

Initial Conditions. Unit 2 is operating at 97% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.

Turnover: Transfer from Normal Hydrogen Seal Oil System to Emergency Seal Oil Lineup starting at step 7.3.1 of 34SO-N42-001-2. This is for a PM that will last approximately 3 hours. Once complete raise reactor power to 100% RTP.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Transfer from Normal Hydrogen Seal Oil System to Emergency Seal Oil Lineup starting at step 7.3.1 of 34SO-N42-001-2.
2	N/A	R (ATC)	Raise Reactor power to 100% RTP using Recirc.
3	mfE51_65 loE51_F010G1 loE51_F010R2 mf60231261 aoE51-R604	I (BOP) TS (SRO)	RCIC Torus Level Sensor Fails High; with failure of CST valve in almost closed position (Valve overload). Time compression repair and re-alignment back to CST.
4	mfB31_135A	C (ATC) TS (SRO)	Recirc ASD 2A Cell Bypass; Recirc 2A speed decreases resulting in a flow mismatch.
5	mf65402047	C (BOP)	Drywell Cooling Unit B008A experiences a low flow condition.
6	mfB21_128M EGB21-28	C (ATC)	Leaking ADS valve, 2B21-F013M. The ATC will diagnose elevated tailpipe temperatures and then will close after the ATC cycles the control switch. (**Critical Task**) The SRO will determine a Tracking RAS.
7	mfC71_59 mfC11_211	M (ALL)	Spurious Reactor scram/ATWS. Insert control rods/SBLC (**Critical Task**)
8	mfC41_240A mfC41_240B	C (ALL)	SBLC first pump fails to inject, second pump works.

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

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 1

Event Description: Transfer from Normal Hydrogen Seal Oil System to Emergency Seal Oil Lineup starting at step 7.3.1 of 34SO-N42-001-2. This is for a PM that will last approximately 3 hours.

Time	Position	Applicant's Actions or Behavior
10 Mins		*SIMULATOR OPERATOR, IF contacted, report the following:* • *This is NOT a prolonged lineup and the PM on the Main Seal Oil Pump will only take a couple of hours.*
	BOP	• Enters Transfer To Emergency Seal Oil Pump Operation at step 7.3.1 • Starts 2N42-C002, Emergency H2 Seal Oil Pump, (2H11-P651). • Confirms annunciator EMERG SEAL OIL PUMP RUNNING (651-216) is ALARMED. • Places 2N42-C004, Main H_2 Seal Oil Pump, in OFF position (2H11-P651). • Places 2N42-C003, Recirc H_2 Seal Oil Pump, in OFF position (2H11-P651). • Directs SO to open 2N42-F047, Seal Oil Vacuum Pump Vent Valve, to break vacuum on the Vacuum Pump suction line (Hyd Seal Oil Unit). *SIMULATOR OPERATOR, when contacted as SO, wait 2 minutes, then report 2N42-F047, Seal Oil Vacuum Pump Vent Valve, is open.* • Places 2N42-C001, H2 Seal Oil Vacuum Pump, in the OFF position (2H11-P651). • Directs SO to Close 2N42-F047 when 2N42-PI-R302, Vacuum Tank Pressure Indicator, is at atmospheric pressure. *SIMULATOR OPERATOR, wait 2 minutes, then report 2N42-F047 is close.* • Directs SO to Close 2N42-F042, Vacuum Tank Inlet Valve and to check 2N42-R300, Seal Oil Pump Disch Press, indication is 100 - 110 psig. *SIMULATOR OPERATOR: wait 2 minutes, then report 2N42-F042 is close and 2N42-R300, Seal Oil Pump Disch Press, indication is 105 psig.* • Notifies SRO that the Emergency Seal Oil Pump Lineup is in service.
		SIMULATOR OPERATOR, at the Chief Examiner's request, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 2		Page 3 of 23
Event Description: Raise Reactor power to 100% RTP using Recirc.		
Time	**Position**	**Applicant's Actions or Behavior**
10 Min	SRO	• Directs ATC to increase reactor power to 100% RTP by increasing Recirc flow. Power increases are NOT to exceed 10 MWe/min.
		NOTE: *May get the RBM UPSCALE, (603-202) and ROD OUT BLOCK, (603-238) alarm, if a peripheral control rod is NOT selected. This is expected, and the operator may select a peripheral rod at this time.* *May also get Alarm HEATER TROUBLE, (650-135), alarm. This is expected at this power level.*
	ATC	• IAW 34SO-B31-001-2 (step 7.1.5) & 34GO-OPS-005-2, the ATC increases Recirc pump speed, NOT to exceed 10 MWE per minute by depressing the RAISE SLOW or RAISE MEDIUM pushbuttons on the Master (P603 panel) or Individual controls (P602 panel) until reactor power is 100% RTP. • If using Individual Controls, pump speed increases will alternate between the "A" & "B" Recirc pumps to prevent excessive flow mismatches. • Monitors power increase by observing APRM and generator output indications.
	ATC	• Complies with 34SO-B31-001-2, Limitation 5.2.15, which states: WHEN changing Recirc pumps speed while in Two Loop operation maintain pump speeds to limit recirculation loop jet pump mismatch within the following limits: • <10% of rated core flow (7.7 E6 lbm/hr) WHEN operating < 70% of rated core flow; AND • <5% of rated core flow (3.85 E6 lbm/hr) WHEN operating at > 70% of rated core flow.
	ATC	Notifies the SRO that reactor power has been increased to 100% RTP.
		SIMULATOR OPERATOR, at the Chief Examiner's request, proceeds to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-5 Event No.: 3		Page 4 of 23
Event Description:	RCIC Torus Level Sensor Fails High; with failure of CST valve indication position.	

Time	Position	Applicant's Actions or Behavior
20 Min		*At the Chief Examiner's direction, SIMULATOR OPERATOR ENTERS: (**RB-3**) mfE51_65 AND ENSURE Event Trigger **EGE51-4** performs the following:* *Turns off the lights for 2E51-F010* *Overrides E51-R604 suction pressure to ~ 19.8 psig* *Inserts malfunction mf60231261, RCIC Motor Overload, alarm* *Inserts Event Triggers **EGE51-5 & EGE51-6***
	ALL	• TORUS LEVEL HIGH RCIC, (602-230) and RCIC VALVES MOTOR OVERLOAD, (602-309), alarms are received on P601.
	SRO	• Directs an operator to enter 34AR-602-230-2 and 34AR-602-309-2

	BOP	• Enters TORUS LEVEL HIGH RCIC, (602-230);
		  • Determines that RCIC Suction has aligned to the Torus
		    • Verifies 2E51-F003, 2E51-F031 and 2E51-F029 are open.
		    • Verifies that 2E51-F010 is closed. (Cannot perform this step because 2E51-F010 has no light indication)
		  • Determines that Torus level is NOT high and is stable.
		  • Determines that RCIC should NOT have auto swapped to the Torus.
		  • Determines RCIC suction pressure is ~20 psig.
		• Notifies SRO that RCIC suction valve, 2E51-F010, has no light indication.
		• Notifies SRO of the following TS (found in Section 8.0 of ARP);
		  • 3.6.2.2, Suppression Pool Water Level
		  • 3.3.5.2, RCIC System Instrumentation
		  • 3.5.3, RCIC System

	BOP	• Enters 602-309
		  • Determines that 2E51-F010 has NO lights illuminated.
		  • Dispatches operator/Maintenance to reset the thermal overload for 2E51-F010 (MCC 2R24-S021 Breaker # 2B)

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 3

Event Description: RCIC Torus Level Sensor Fails High; with failure of CST valve indication position.

Time	Position	Applicant's Actions or Behavior
	SRO	• Dispatches operator/Maintenance to reset the thermal overload for 2E51-F010 (MCC 2R24-S021 Breaker # 2B) (ATC may do this also) • Directs operator to monitor suction pressure on RCIC.
		SIMULATOR OPERATOR, if dispatched to ATTS panels, report all Torus level indicators are normal. *Also, 3 minutes after Maintenance is sent to investigate, NOTIFY the control room that local level switch, 2E51-LS-N062B, has failed upscale.*
	BOP	• Reports to the SRO that 2E51-LS-N062B has failed upscale
		NOTE: *Chief Examiner, if SRO evaluates a different TS call, provide follow-up question on TS determination.*
	SRO	• Enters Tech Specs 3.3.5.3, Condition D.2.1 or D.2.2, to place the channel in trip or align RCIC suction to the Suppression pool within 24 hours.
		SIMULATOR OPERATOR, after 2 minutes from being dispatched to the breaker, DELETE override loE51-F010G1 AND ENSURE EVENT TRIGGER ***EGE51-6*** *DELETES the following:* *loE51-F010R2 and mf60231261.* *As an Operator, NOTIFIES the control room that the breaker for 2E51-F010 has been reset.*
	BOP	• Confirms 2E51-F010 has traveled full closed. • Informs SRO that 2E51-F010 is full closed. • Alarm RCIC VALVES MOTOR OVERLOAD, (602-309), clears

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 3

Event Description: RCIC Torus Level Sensor Fails High; with failure of CST valve indication position.

Time	Position	Applicant's Actions or Behavior
		At the Chief Examiner's direction, SIMULATOR OPERATOR, DELETE mfE51_65, then as I & C, report that it is now one hour later (time compression) and that 2E51-N062B repair and calibration is complete.
	BOP	• Alarm TORUS LEVEL HIGH RCIC, (602-230), clears.
	SRO	• Directs Operator to align RCIC to the CST. • May (if NOT done by BOP) dispatch Maintenance to observe the reopening of 2E51-F010.
		SIMULATOR OPERATOR ENSURE EVENT TRIGGER ***EGE51-5*** *modifies E51-R604 suction pressure to 28 psig and then deletes override.*
	BOP	• Enters 34SO-E51-001-2 step 7.3.7 to align RCIC to the CST. • Starts closing 2E51-F029 and 2E51-F031, then starts opening 2E51-F010 prior to 2E51-F029 and 2E51-F031 going full closed. • When valves have completed stroking, notifies the SRO that RCIC is aligned to the CST. • Notifies the SSS to vent RCIC discharge piping.
	SRO	• As time allows, determines that the LCO for 2E51-N062B is met.
		SIMULATOR OPERATOR; At Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301	**Scenario No.:** 12-5	**Event No.:** 4	Page 7 of 23

Event Description: Recirculation Pump 2A ASD Cell will auto bypass.

Time	Position	Applicant's Actions or Behavior
10 Min		*SIMULATOR OPERATOR, At Chief Examiner's direction, press* ***(RB-6)*** *to activate:* • *mfB31_135A, Recirc ASD B Cell Bypass*
	SRO	• Direct Maintenance be contacted to determine cause of Recirc speed decrease • Evaluates TS LCO TS 3.4.1 Recirculation Loops Operating (Condition A.1)
		NOTE*: With the ASD 2A Cell Bypassed, the operator may enter 34AB-B31-001-2, Reactor Recirculation Pump(s) Trip, Recirc Loops Mismatch, OR ASD Cell Bypass", first due to Recirc flow mismatch.*

	ATC	• Respond to ASD A TROUBLE, (602-108), Annunciator
		• Diagnose Recirc pump speed mismatch
		• Confirms that an ASD cell has failed and is bypassed using SPDS or by having it verified locally at the ASD cabinet.
		• Enter 34AB-B31-001-2, Reactor Recirculation Pump(s) Trip, Recirc Loops Mismatch, or ASD Cell Bypass
		  • Confirms the SPD HLD RESET pushbutton is illuminated
		  • Enter section III of 34AB-B31-001-2
		    • If Recirc speed mismatch >35%, inform SRO of 1-hour limit to balance Recirc Pump flows (will determine < 35% mismatch)

	SRO	If asked, Reactor Engineering guidance for **decreasing** power is: • "Limit the rate of power change to 10 MWe/minute"

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 4

Event Description: Recirculation Pump 2A ASD Cell will auto bypass.

Time	Position	Applicant's Actions or Behavior

	ATC	• When directed by SRO to **decrease** Recirc Pump 2B:
		  • Decreases speed of Recirc Pump 2B per 34SO-B31-001-2, Reactor Recirc System, by depressing SLOW Lower or MEDIUM Lower pushbutton on ASD 2B.
		  • Once flow mismatch is within TS limits, enters Section IV, ASD Power Cell Failure
		• When directed by SRO to increase Recirc Pump 2A speed:
		  • Depresses the ASD 2A SPD HLD RESET Pushbutton Indicating Lamp
		  • Increases speed of Recirc Pump 2A by depressing SLOW Raise or MEDIUM Raise pushbutton on ASD 2A

		NOTE to Examiners: *TS SR 3.4.1.1 requires Recirc flow mismatch be less than 5% if operating at greater than or equal to 70% rated core flow, and mismatch be less than 10% if operating at less than 70% rated core flow.*
		SIMULATOR OPERATOR: *When the crew has diagnosed that possibly, an ASD Cell is bypassed, then with Chief Examiner's concurrence:* *Call the Control Room as I&C with the following message:* *Recirculation Pump 2A ASD has automatically bypassed a cell, conditions at the ASD are normal for this condition.*
		NOTE: *After the ASD Trouble alarm has cleared OR at Chief Examiner's direction, move on to the next Event.*

Op-Test No.: 2019-301 Scenario No.: 12-5 Event No.: 5		Page 9 of 23
Event Description: 2T47-B008A, Drywell Cooling Fan failure.		
Time	**Position**	**Applicant's Actions or Behavior**
5 Min.		*SIMULATOR OPERATOR:* *At the direction of the Chief Examiner ACTIVATE (**RB-5**)* • *mf65402047 Drywell Cooling B008A/8B Flow Low (Annunciator ON)* ***NOTE:*** *Event Triggers **EGT47-1** will insert overrides for B008A/modify temperatures **& EGT47-2** will slowly modify temperatures at the cooler.*

	BOP	Responds to annunciator DRYWELL COOLING UNIT B008A/8B FLOW LOW, (654-042):
		• At Panels 2H11-P654 AND 2H11-P657, perform the following:
		  • Confirms the in service 2T47-B008A, fan, has TRIPPED
		  • Confirms the standby 2T47-B008B, fan, has auto STARTED (B008B has failed to auto start, places 2T47-B008B, fan to RUN
		  • Places 2T47-B008A, fan to OFF
		  • Dispatches SO/Maintenance to investigate 2T47-B008A breaker/fuses
		  • Notifies SRO of 2T47-B008A failure

	SRO	Reviews TS 3.6.3.3 Drywell Cooling System Fans and determines a TRACKING RAS exists for 2T47-B008A failure.
		SIMULATOR OPERATOR: *When the BOP starts 2T47-B008B, fan, the low flow condition mf65402047 Drywell Cooling B008A/8B Flow Low (Annunciator ON) will clear.*
	BOP	Annunciator DRYWELL COOLING UNIT B008A/8B FLOW LOW, (654-042) clears when 2T47-B008B, fan is started.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-5 Event No.: 6		Page 10 of 23
Event Description:	Leaking ADS valve, 2B21-F013M. The ATC will diagnose elevated tailpipe temperatures and then will close after the ATC cycles the control switch. (**Critical Task**) The SRO will determine a Tracking RAS.	

Time	Position	Applicant's Actions or Behavior
8 Min		*SIMULATOR OPERATOR: To insure the ATC operator gets the next malfunction, wait until the BOP is in the back panels OR as Shift Manger, request the BOP to get some back-panel readings.* *SIMULATOR OPERATOR: At the direction of the Chief Examiner, ACTIVATE: (**RB-4**) - mfB21_128M f:28 r:1000.*
	ALL	• Recognize annunciators: • SAFETY BLOWDOWN PRESSURE HIGH, (603-122)
		SIMULATOR OPERATOR: When SRV 2M is determined to be leaking, MODIFY mfB21_128M to final: 30 d:0. *The ATC may enter the abnormal procedure first before addressing the ARPs.*

	ATC	• Enters 603-122 annunciators
		  • Confirms which safety relief valve has opened using the amber valve leakage indicator (NO amber light illuminated INITIALLY, will illuminate after Crew identifies SRV 2M is leaking)
		  • Directs BOP to check back panel tail pipe temperatures
		  • Reports to the SRO and ATC operator that 2M SRV is open

		*SIMULATOR OPERATOR: When the operator cycles the ADS 2M control switch, ENSURE EVENT TRIGGER **EGB21-28** activates and deletes mfB21_128M and inserts rfB21_310 after SRV 2M is cycled two (2) times.*

	ATC	• Enters 34AB-B21-003-2, Failure of Safety/Relief Valves
		  • Confirms the green AND amber lights are illuminated for 2M SRV
		  • Cycles the 2M SRV control switch several times between Open/Close (**Critical Task**)
		  Critical Task is met if SRV 2M control switch is cycled prior to Torus temperature exceeding 110°F (Unsafe area of BIIT graph in approximately 15 minutes).
		  • May depress the ADS Logic A Timer Reset pushbutton (2B21-S2A)
		  • May depress the ADS Logic B Timer Reset pushbutton (2B21-S2B)
		  • May depress LLS Channel A / C Reset pushbutton (2B21-S15A)
		  • May depress LLS Channel B / D Reset pushbutton (2B21-S15B)
		  • Notifies SRO that when SRV 2M control switch was cycled, SRV 2M closed and lost light indication.

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 6

Event Description: Leaking ADS valve, 2B21-F013M. The ATC will diagnose elevated tailpipe temperatures and then will close after the ATC cycles the control switch. (**Critical Task**) The SRO will determine a Tracking RAS.

Time	Position	Applicant's Actions or Behavior
		• Confirms that SRV 2M is closed by monitoring one or more of the following: • SRV tailpipe temperature decrease (Directs BOP to P614 panel) • Torus level stabilizing • Torus Temp stabilizing • Rx and Generator power returns to the pre-event level • Resets the SRV leak detection by placing the Leak Detection Logic A Reset keylock switch and Leak Detection Logic B Reset keylock switch to RESET position and back to NORMAL position • Confirms that the Amber SRV indicating lights have Extinguished • SAFETY BLOWDOWN PRESSURE HIGH, (602-311), clears • Informs the SRO that SRV 2M is closed and has NO light indication.
	SRO	If NOT performed by ATC, informs the crew that operability of the suppression chamber-drywell vacuum breakers must be performed within 12 hours per 34SV-T48-002-2, Suppression Chamber To Drywell Vacuum Breaker System Operability. If NOT performed by ATC, notifies Chemistry and initiates a CR to initiate increased monitoring of vessel moisture content carryover per 64CH-SAM-025-0. Determines a Tracking RAS exists for TS LCO 3.5.1.

Op-Test No.: 2019-301	**Scenario No.:** 12-5	**Event No.:** 6	Page 12 of 23

Event Description: Leaking ADS valve, 2B21-F013M. The ATC will diagnose elevated tailpipe temperatures and then will close after the ATC cycles the control switch. (**Critical Task**) The SRO will determine a Tracking RAS.

Time	Position	Applicant's Actions or Behavior
		*At this time, Torus temperature will still be below 95°F, therefore RHR is NOT required to be placed into Torus Cooling. The SRO may elect to place Torus Cooling in service, since steam was admitted to the Torus. The following steps are written **IF** the SRO elects to place Torus Cooling in service.*
		NOTE: *The operator may place torus cooling in service by using the Placard that's available or using the appropriate section of the procedure. These steps assume the Placard is used. The A or B loop of RHR may be used. The following steps are written assuming "B" loop and "B" pump is used. If "A" loop is used, substitute "A" for "B" for valves and if "B" pump is NOT used substitute "A", "C", or "D" for "B" pump.*

	BOP	• Enters 34SO-E11-010-2, Residual Heat Removal
		  • Places RHRSW in service
		    • Overrides 2E11-F068B Low Discharge Pressure Interlock
		    • Positions 2E11-F068B to 45% OPEN
		    • Receives alarm, RHR HX B DIFF PRESS LOW, (601-215)
		    • Starts RHRSW pump B
		    • Places 2E11-F068B Low Discharge Pressure Interlock switch to normal position.
		    • Positions 2E11-F068B to obtain < 4400 gpm AND < 450 psig

	BOP	• IF desired to start a SECOND RHRSW pump,
		  • Throttles 2E11-F068B to achieve max flow rate (NOT to exceed 4400 GPM).
		  • Opens 2E11-F068B an additional 5%.
		  • Starts second RHRSW Pump.
		  • Positions 2E11-F068B to obtain < 8800 gpm AND < 450 psig

Op-Test No.: 2019-301 Scenario No.: 12-5 Event No.: 6		Page 13 of 23
Event Description:	Leaking ADS valve, 2B21-F013M. The ATC will diagnose elevated tailpipe temperatures and then will close after the ATC cycles the control switch. (**Critical Task**) The SRO will determine a Tracking RAS.	

Time	Position	Applicant's Actions or Behavior
	BOP	• Places RHR B Loop in Torus cooling per the placard by performing the following steps: • Opens 2E11-F048B • Closes 2E11-F047B. • Opens 2E11-F003B. • Starts RHR Loop B pump • Receives alarm, RHR LOW FLOW, (601-222) • Opens 2E11-F028B • Receives alarm, AUTO BLOWDOWN CS OR RHR PRESS PERMISSIVE, (602-312) • Receives alarm, SEC SYSTEM AUTO INITIATION SIGNAL PRESENT, (650-234) • Throttles OPEN 2E11-F024B • Alarm, RHR LOW FLOW, (601-222), clears • Opens 2E11-F047B • Ensures RHR flow is < 11,500 GPM, THEN Closes 2E11-F048B • Notifies the SRO that RHR "B" loop is in service • May place the second pump in service.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 Scenario No.: 12-5 Event No.: 7

Event Description: Spurious Reactor scram/ATWS. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
10 Min		*SIMULATOR OPERATOR, at the Chief Examiner's direction, ACTIVATE: (**RB-7**) malfunction mfC71_59, Spurious Reactor Scram.*
		*SIMULATOR OPERATOR, to prevent control rod motion when the manual scram is repeated, THEN following the Reactor Scram, ENSURE Event Trigger **EGC71-15** modifies malfunction mfC11_211, SDV ATWS (Var), to a Final Value of 100 & inserts aiC11-R607-1, f:25 r:1000 & deletes mfC71_59.*
	SRO	A Spurious Reactor Scram occurs: • Enters RC or RC-A EOP Flowcharts • Directs ATC to perform RC-1 placard • Directs BOP to perform RC-2 and RC-3 placards • If time allows assigns TC-1 to be performed • Enters the RCA EOP flow chart, 31EO-EOP-011-2, for a scram condition and reactor power above 5%. • Enters CP-3 EOP flow chart, 31EO-EOP-017-2, for ATWS level control.
	SRO	Directs ATC to (or may observe): • Confirm the reactor Mode Switch in SHUTDOWN. • Confirm ARI Initiation. • Confirm Recirc runback to minimum/tripped.

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 7

Event Description: Spurious Reactor scram/ATWS. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
	ATC (Placard)	Performs actions of placard RC-1 after Reactor SCRAM. • Manually SCRAMs the Reactor using the SCRAM pushbuttons. • Places Rx Mode Switch in SHUTDOWN. • If Scram blue lights are NOT illuminated, initiates Alternate Rod Insertion (ARI) by rotating the button collars and depressing both ARI pushbuttons at the same time. • Uses the Full Core Display and Rod Worth Minimizer to determine that all control rods are NOT inserted past position 02. • Informs the SRO that all rods are NOT fully inserted (ATWS). • If NOT tripped, places Recirc to minimum speed (if power is above 5%, the ATC is directed to trip Recirc IAW the RC-1 placard). • Injects SBLC (power is above 5%, the ATC is directed to inject SBLC IAW the RC-1 placard). ***NOTE: See Event 8 for SBLC injection.*** • Inserts IRMs and SRMs. • Places SDV Isol Vlv Switch to "ISOL" and verifies closed.
	BOP	Performs actions of placards RC-2 and RC-3 after Reactor SCRAM.

	BOP (Placard)	Performs RC-2 actions consisting of:
		• Confirms proper Level Control response:
		  • Checks ECCS Injection Systems
		  • Ensures FW Master Controller setpoint reduces to 9 inches and output reduces to 25% of previous value
		• When feed flow is less than the capacity of the S/U level control valve (≈ 1.5 mlbm/hr), then:
		  • Opens 2N21-F125.
		  • Confirms/places 2C32-R619, FW S/U level control valve controller, in Auto, set at approximately 9 inches.
		  • Closes 2N21-F110.
		  • Will control RWL at 9 inches.

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 7

Event Description: Spurious Reactor scram/ATWS. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
	BOP (Placard)	Performs RC-3 consisting of: • Monitor RPV pressure. • Confirm proper operation of pressure control system (TBV, LLS, etc.). • If necessary, allow RPV pressure to exceed 1074 psig then cycles any SRV to initiate LLS. • Maintain RPV pressure between 1074 and 800 psig. • Notify SRO of pressure control system operation.
	SRO	Directs ATC or STA to report reactor power or observes reactor power on SPDS. Directs ATC to Reset ARI and insert control rods IAW 31EO-EOP-103-2.
		NOTE: *If asked, STA will direct the ATC to start in the center of the core and spiral out in a "black and white" pattern.*

	ATC	• Reports power level to the SRO.
		• Enters 31EO-EOP-103-2, EOP Control Rod Insertion Methods, section 3.7, Driving Control Rods at panel 2H11-P603.
		• Confirms ARI initiation signals are clear and Then depresses ARI Reset pushbutton OR dispatches an operator to place ARI System Test switch, to TEST, on panel 2C11-P001
		• Check annunciator ARI INITIATED,603-304, clear
		• Attempts to drive rods by:
		  • Places Reactor Mode switch to REFUEL.
		    • Places Rod Worth Minimizer bypass switch to BYPASS.
		    • Obtain recommendations from STA
		    • Verifies adequate CRD drive water pressure for driving rods and may operate 2C11-R600, CRD Flow Control, to achieve higher drive water DP.
		    • May start second CRD pump
		    • Drives rods to at least 02 using the Emerg In or IN

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 7

Event Description: Spurious Reactor scram/ATWS. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
	ATC	• Enters 31EO-EOP-103-2, EOP Control Rod Insertion Methods, section 3.3, Repeating Manual Scram at panel 2H11-P603. • Bypasses scram discharge volume high level trip at 2H11-P603. • Dispatches operator to install jumpers to override all automatic scram signals. • Places Discharge Volume Isolation Test switch to Norm at 2H11-P603. • Resets Scram when notified that jumpers have been installed. • Confirm all SDV Vent and Drain Valves are open.
		NOTE: *2C11-R607, Press Control Vlv F127, controller is failed to allow only ~25% valve position. A valve position of 25% will NOT allow control rods to insert from Cooling Water DP.*
		• Enters 31EO-EOP-103-2, EOP Control Rod Insertion Methods, section 3.8, Increasing CRD Cooling Water Dp at panel 2H11-P603. • Places 2C11-R607, Press Control Vlv F127 Controller, in MAN • Increases output of 2C11-R607 to 100% at 2H11-P603 • Confirms open OR fully opens 2C11-F003 • Places 2C11-R600, CRD Flow Control, in MANUAL • Increases output of 2C11-R600 to 100% • Closes 2C11-F005, Return To Vessel Flow Control
	SRO	• Directs BOP to lower water level to below -60 inches and then maintain between -90 inches and -60 inches. • Directs SSS to bypass MSIV Low Water Level isolation IAW 31EO-EOP-100-2. • Directs BOP to override 2P41-F316A-D, PSW Isolation valves

Op-Test No.: 2019-301	Scenario No.: 12-5	Event No.: 7	Page 18 of 23
Event Description:	Spurious Reactor scram/ATWS. (**Critical Task**)		

Time	Position	Applicant's Actions or Behavior
	BOP	Performs one or more of the following, as necessary, to reduce injection and lower RWL to < -60 inches:) (***Critical Task***) *(Critical Task is met if injection into the RPV is stopped within 5 minutes of Recirculation pumps being tripped)* • Places HPCI Flow controller in Manual and lowers output to achieve a lowering RWL trend or trips HPCI. • Lowers Feedwater flow as necessary to achieve a lowering RWL trend • If required, places RCIC Flow controller in Manual and lowers output to achieve a lowering RWL trend.
	SRO	When RPV level is below –60 inches, directs BOP to control RPV level within a level band. Any band between –60 inches and –180 inches is acceptable. (Typically –60" to –100" to maintain RPV level above –101") If RWL increases to >-60 inches and Rx power is >5%, the override will be re-addressed to once again, lower level to < -60".
	BOP	Performs one or more of the following, as necessary, to control injection and maintain RWL in the established band: • Places HPCI Flow controller in Auto and adjusts output to maintain RWL band. • Adjusts Feedwater flow as necessary to maintain RWL band. • Places RCIC Flow controller in Auto and adjusts output to maintain RWL band.

Op-Test No.: 2019-301 Scenario No.: 12-5 Event No.: 7	Page 19 of 23
Event Description: Spurious Reactor scram/ATWS. (**Critical Task**)	

Time	Position	Applicant's Actions or Behavior

	BOP/ATC	As time allows, and when generator load goes below 80 MWe, the crew performs TC-1 to trip the Main Turbine.
		• Manually Trip the Turbine.
		• Confirm TSV's, TCV's, and CIV's have properly closed.
		• Confirm the generator PCBs and EX2100 Control Tripped/Stopped.
		• Confirms/Opens PCB 179740
		• Confirms/Opens PCB 179750
		• Confirms the 4160 VAC station service busses have transferred to their alternate supply.
		• Confirms/Places TGM in auto.
		  • Start TG Oil Pump
		  • Motor Suction Pump
		  • Lift Pumps
		• Confirms Steam Seal & Condenser Vacuum systems proper operation.
		• Closes the RSSV's (2N11-F004A and F004B).
		• Notifies the SRO that TC-1 is complete.

	SRO	If time allows, directs BOP operator to lower reactor pressure to <845 psig
	BOP	If directed, lowers pressure setpoint to <845 psig using the DEHC system as described on the following graphic.
		SIMULATOR OPERATOR, at the direction of the Chief Examiner, PROCEEDS to next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-5 **Event No.:** 8		
Event Description:	SBLC first pump fails to inject, second pump works.	

Time	Position	Applicant's Actions or Behavior
		*SIMULATOR OPERATOR; ENSURE EVENT TRIGGERS **(EGC41-1 &EGC41-2)** prevents the first pump starting but NOT the second are inserted. They were inserted from the beginning.*

	ATC	• Injects SBLC (power >5%)
		  • Unlocks and places SBLC pump select switch in "Start Sys A" or "Start Sys B" position.
		  • Confirms Squib Valve Ready Lights are extinguished.
		  • Confirms SBLC Loss of Continuity to Squib Valve annunciator is alarmed.
		  • Recognizes that the selected SBLC pump DID NOT start.
		  • Places SBLC pump select switch in "Start Sys B" or "Start Sys A" position. (The pump NOT attempted first.)
		  • Confirms the selected second SBLC pump started.
		  • Confirms closed 2G31-F004 (RWCU Isolation Valve).
		  • Reports to SRO, SBLC is injecting IAW 34SO-C41-003-2 and the first pump selected failed to start.

		SIMULATOR OPERATOR, when the following conditions exist: *1. Scram is RESET,* *2. RWL is controlled between -60 and -90 inches,* *WITH CHIEF EXAMINERS DIRECTION, the scenario may be terminated.*

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-5** **Op-Test No.:** **2019-301**

Examiners: ____________ **Operators:** ____________ **SRO**

____________ ____________ **RO**

____________ ____________ **BOP**

Initiating Conditions:	Unit 2 is operating at 97% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Turnover	Transfer from Normal Hydrogen Seal Oil System to Emergency Seal Oil Lineup starting at step 7.3.1 of 34SO-N42-001-2. This is for a PM that will last approximately 3 hours. Once complete raise reactor power to 100% RTP.

Summary:

- **Event 1:** Normal; The BOP will transfer Hydrogen Seal Oil from a Normal lineup to the Emergency Seal Oil lineup IAW the system operating procedure.

- **Event 2:** Reactivity; The ATC will raise Reactor power to ~100% RTP using Recirc.

- **Event 3:** Instrument/TS; The RCIC Torus Level Sensor Fails High; with failure of CST valve in almost closed position (Valve overload). Time compression repair and re-alignment back to CST.

- **Event 4:** Reactivity/Component/TS; Recirculation Pump 2A ASD Cell will auto bypass. This will result in a flow and power reduction. The ASD Cell Bypass and Recirc flow mismatch will be addressed by annunciator response procedures and an abnormal procedure. The SRO will address TS for Recirc flow mismatch. The plant will be operating in the Analyzed Region of the Power-to-Flow map. The ATC operator will adjust Recirc Pump speed to restore the mis-matched flow.

- **Event 5:** Component; The Drywell Cooling Unit B008A experiences a low flow condition. The BOP will start B008B and secure B008A.

- **Event 6:** Component; Leaking ADS valve, SRV 2M. The ATC operator will attempt to close the SRV IAW the abnormal procedure for an open SRV. After the ATC operator cycles the control switch for ADS 2M, the SRV will close. (**Critical Task**) If Torus temperature exceeds 95°F, the BOP operator will place RHR in Suppression Pool Cooling.

- **Event 7:** Major; A Spurious Turbine trip will cause a Reactor scram and subsequent ATWS. The SRO will direct/ensure the ATC injects SBLC prior to leaving RC-1 AND the ATC will insert control rods within 20 minutes of the scram. (**Critical Task**)

- **Event 8:** Component; The first SBLC pump fails to start, second pump works injecting SBLC prior to the ATC leaving RC-1.

NRC DRAFT

Facility: E. I Hatch **Scenario No.: 12-5** **Op-Test No.: 2019-301**

Critical Tasks

- Cycles ADS 2M control switch to close SRV prior to Torus temperature exceeding 110°F (Unsafe area of BIIT graph) (approximately 15 minutes). **(Event 6)**

- Injection into the RPV is stopped within 5 minutes of Recirculation pumps being tripped. (**Event 7)**

	ES 301-4 Attributes	Required	Actual	Items
1.	Total Malfunctions	5-8	6	1. RCIC Torus suction valves **(Event 3)** 2. Recirc ASD 2A Cell Bypass. **(Event 4)** 3. B008A low flow. **(Event 5)** 4. Leaking SRV 2B21-F013M. **(Event 6)** 5. Spurious Reactor scram. **(Event 7)** 6. 1st SBLC pump fails. **(Event 8)**
2.	Malfunctions After EOP Entry	1-2	1	1. 1st SBLC pump fails. **(Event 8)**
3.	Abnormal Events	2-4	3	1. Recirc ASD 2A Cell Bypass. **(Event 4)** 2. B008A low flow. **(Event 5)** 3. Leaking SRV 2B21-F013M. **(Event 6)**
4.	Major Transients	1-2	1	1. Spurious Reactor scram. **(Event 7)**
5.	EOPs entered, requiring substantive actions	1-2	2	1. RCA 2. PC
6.	EOPs contingencies entered with substantive actions	0-2	1	1. CP-3
7.	Preidentified Critical Tasks	≥ 2	2	1. Cycles ADS M control switch. **(Event 6)** 2. RWL Injection stopped during ATWS. (**Event 7)**

ILT 12 NRC DRAFT Scenario 5

SHIFT TURNOVER

target ZERO Every day, every job, safely.	**Safety Focus**
UNIT 1 STATUS	
Plant Conditions:	• Unit 1 is in day 3 of 5 of forced outage.
Plant Conditions:	• Unit 2 is operating at 97% RTP. • 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Protected Train: ☒ Division I ☐ Division II	**EOOS:** ☒ Green ☐ Yellow ☐ Orange ☐ Red
Scheduled evolutions:	☐ Transfer from Normal Hydrogen Seal Oil System to Emergency Seal Oil Lineup starting at step 7.3.1 of 34SO-N42-001-2. This is for a PM that will last approximately 3 hours. ☐ Once complete raise reactor power to 100% RTP.
Surveillances due this shift:	☐ NONE
Inop Equipment:	☐ 2D11-K615B, Off gas Post Treatment Radiation monitor has failed Downscale. IAW TS/TRM, I&C has placed 2D11-K615B in the trip condition while maintaining the function of 602-405, Post Treatment O/G Radiation Hi-Hi-Hi/Inop. A Caution Tag is attached to 2D11-K615B switch.
Active tagouts:	☐ NONE
Rod Configuration:	☐ See RWM Step 38

NRC DRAFT

Facility: E. I Hatch **Scenario No.:** 12-6 **Op-Test No.:** 2019-301

Examiners: ____________ **Operators:** ____________ **SRO**
____________ ____________ **RO**
____________ ____________ **BOP**

Initial Conditions. Unit 2 is operating at ~4% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written. RHR Loop B is operating in Torus Cooling Mode due to a recently performed HPCI surveillance.

Turnover: IAW 34SO-E11-010-2, lower Torus water level to 147.5 inches, and then continue with the Startup IAW 34GO-OPS-001-2 at step 7.4.1.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP) TS (SRO)	Lower Torus level to 147.5 inches using RHR Loop 2B IAW 34SO-E11-010-2, Step 4.4.5.1.
2	N/A	R (ATC)	Withdraw Control Rods to increase power.
3	mf60311325	C (ATC)	High amps on CRD pump 2A requiring swapping to standby pump.
4	mfN33_154	C (BOP)	Turbine Gland Seal Reg Fails Closed (must be in chest warming). (**Critical Task**)
5	svoB21036 mf60211154 mfC12_26_22-27	I (ATC) TS (SRO)	One (1) Reactor Pressure ATTS trip unit causes a half scram and Control Rod 22-27 scrams in due to a blown fuse. The control rod fuse is repaired (Time Compress) and the rod is withdrawn.
6	mfB21_131	I (BOP) TS (SRO)	ADS Inadvertent initiation/Inhibit used. (**Critical Task**)
7	mfB21_123A	M (ALL)	Leak in Drywell causes High Drywell pressure scram.
8	diE11-F016A diE11-F016B	C (ATC)	RHR 2E11-F016A/B stuck closed requiring swapping to other loop of DW spray.

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

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 1

Event Description: Lower Torus water level to 147.5 inches using RHR Loop 2B IAW 34SO-E11-010-2, Step 7.4.5.1.

Time	Position	Applicant's Actions or Behavior
12 Min	SRO	• Directs the operator to lower Torus water level to 147.5" using B loop of RHR.
		SIMULATOR OPERATOR, when requested, INFORM as the Radwaste Operator that the Waste Surge Tank level is 6% and is available to receive Torus water level.
	BOP	• Enters 34SO-E11-010-2, Residual Heat Removal System, at step 4.4.5.1. • Confirms Radwaste can receive the water to be transferred. • Confirms the RHR discharge water temperature is < 200°F, 2T47-R627, point 3. • Opens 2E11-F049, RHR to Radwaste Valve. • Monitors Torus level on 2T48-R607A (B), 2H11-P602 (2H11-P654). • Throttles OPEN, 2E11-F040, RHR to Radwaste Valve. • Notifies SRO to refer to: SPECIAL REQUIREMENT 3.2.3 Step 2 of 34SO-E11-010-2 and TS: 3.5.1, ECCS-Operating, 3.6.2.3, RHR Suppression Pool Cooling, 3.6.2.4, RHR Suppression Pool Spray, 3.6.2.5, RHR Drywell Spray.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 1		Page 3 of 26
Event Description: Lower Torus water level to 147.5 inches using RHR Loop 2B IAW 34SO-E11-010-2, Step 7.4.5.1.		
Time	**Position**	**Applicant's Actions or Behavior**
	SRO	Reviews SPECIAL REQUIREMENT 3.2.3 Step 2 of 34SO-E11-010-2 and TS: 3.5.1, ECCS-Operating, 3.6.2.3, RHR Suppression Pool Cooling, 3.6.2.4, RHR Suppression Pool Spray, 3.6.2.5, RHR Drywell Spray. Declares RHR Loop 2B inoperable since 2E11-F040 & 2E11-F049 are open.

	SRO	• Reviews TS 3.5.1, ECCS/RCIC.
		  • IAW TS 3.5.1 Condition A,
		    • Declares one low pressure ECCS inoperable (Loop 2B) and must restore to operable status within 7 days.
		  • IAW 3.6.2.3 Condition A,
		    • Declares one RHR Suppression pool cooling system inoperable (Loop 2B) and must restore to operable status within 7 days.
		  • IAW 3.6.2.4 Condition A,
		    • Declares one RHR Suppression pool spray system inoperable (Loop 2B) and must restore to operable status within 7 days.
		  • IAW 3.6.2.5 Condition A,
		    • Declares one RHR drywell spray system inoperable (Loop 2B) and must restore to operable status within 7 days.
		• Once 2E11-F040 & 2E11-F049 are closed, exits the above RAS.

	BOP	• Monitors Torus water level and once level has been lowered to approximately 147.5" secures the flow path.
		  • Closes 2E11-F040, RHR to Radwaste Valve.
		  • Closes 2E11-F049, RHR to Radwaste Valve.
		  • Notifies SRO 2E11-F040 & 2E11-F049 are now closed.
		  • Reports to the SRO that Torus water level has been lowered to 147.5".
		  • As time allows, notifies Radwaste Operator that Torus lowering is complete.

		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 2

Event Description: Withdraw control rods to ~9% power and transfer the Reactor Mode Switch to Run.

Time	Position	Applicant's Actions or Behavior
12 Min	SRO	Directs ATC to continue rod withdrawal (22-39) to approximately 9% power
	ATC	• Starting at Step 14, withdraws all control rods within step to the withdraw limit. • Initials for control rod withdrawal. • Dates for control rod withdrawal. • Notifies SRO that reactor power is approximately 9%.
	SRO	Directs: • ATC confirm all APRMs indicate between 7% AND 10%. • BOP confirm operable APRM DOWNSCALE trips are clear.
	ATC	Reports all APRMs indicate between 7% AND 10%.
	BOP	Confirms operable APRM DOWNSCALE trips are clear by performing the following at the APRM ODAs at 2H11-P608: • Depress the "ETC" key. • UNTIL "TRIP STATUS" option ILLUMINATES. • Depress "TRIP STATUS" key, THEN confirm "APRM FLUX DOWNSCALE ALARM" is NOT active.
	SRO	Directs BOP or ATC to confirm all IRMs are NOT Upscale.
	BOP/ATC	Confirms no IRMs are UPSCALE by observing: • 2H11-P606 upscale lights not illuminated **OR** • 2H11-P603 upscale lights not illuminated **OR** • 2H11-P603 annunciator 603-221, IRM UPSCALE, NOT illuminated.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 2

Event Description: Withdraw control rods to ~9% power and transfer the Reactor Mode Switch to Run.

Time	Position	Applicant's Actions or Behavior
	SRO	Confirms APRM/OPRM Operability: • at least three APRM channels per RPS Trip System are OPERABLE. AND • at least 2 "APRM TWO-OUT-OF-FOUR-VOTER-CHANNELS" per RPS Trip System are OPERABLE. AND • at least 3 OPRM channels per RPS Trip System are OPERABLE. Confirms surveillances are current: • 57SV-C51-001-0, APRM Functional Test. • 57SV-C51-005-0, APRM Calibration. • 57SV-C51-003-0, APRM Two Out of Four Logic Module FT.
		NOTE: *APRM status can be confirmed by the turnover sheet or by directing STA to confirm operability.* *SIMULATOR OPERATOR: If contacted for APRM status, inform the SRO all APRMs are operable and all surveillances are current.*
	SRO	Directs the ATC (or observes) the following annunciators are CLEAR: • MAIN STEAM LINE PRESS A LOW, 603-232, • MAIN STEAM LINE PRESS B LOW, 603-233
	ATC	If directed, reports annunciators 603-232 and 603-233 are clear.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 3

Event Description: High amps on CRD pump 2A requiring swapping to standby pump.

Time	Position	Applicant's Actions or Behavior
10 Min		*At the Chief Examiner's direction, SIMULATOR OPERATOR ENTERS (**RB-3**) mf60311325, CRD Pump A Overload, alarm.*

	ATC	• Receives CRD PUMP A OVERLOAD, 603-137, alarm.
		• Determines that the CRD 2A pump is still in service.
		• Dispatches SO locally to Bus 2R22-S005, Frame 8, to check the following:
		  ◦ Overcurrent relay targets tripped
		  ◦ Amperage reading on all three phases

		SIMULATOR OPERATOR, AFTER 3 minutes from being dispatched, DELETE mf60311325 AND report to the SRO/ATC, as a SO with the ARP, that the HIGHEST Amperage reading was 30 amperes AND one (1) Overcurrent relay target was tripped but has now been RESET.
	SRO	• Dispatches Maintenance to investigate CRD pump 2A overload condition. • After SO report, may direct ATC to shift CRD pumps IAW 34SO-C11-005-2. • Once the alarm is received a 2nd time, directs ATC to shift CRD pumps IAW 34SO-C11-005-2
		SIMULATOR OPERATOR, AFTER 3 minutes from SO report to ATC/SRO, INSERT mf60311325, CRD Pump A Overload, alarm AGAIN.
	SRO	• Once the alarm is received a 2nd time, directs ATC to shift CRD pumps IAW 34SO-C11-005-2

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 3

Event Description: High amps on CRD pump 2A requiring swapping to standby pump.

Time	Position	Applicant's Actions or Behavior
		NOTE: The ATC may direct the CRD pump room coolers to be swapped or may elect to leave the 2T41-B001B cooler in service. Both are acceptable.

	ATC	• Once directed, IAW 34SO-C11-005-2, 7.1.3, Shifting CRD Pumps, performs the following:
		  • Dispatches SO to confirm cooling water valves listed in step 7.1.3.1.2 are open.
		  • Confirms a CRD Room Cooler is in operation per 34SO-T41-002-2, CRD Pump Room Ventilation System by performing the following:
		    • Confirms 2T41-B001B is in Run (may direct BOP to confirm)
		    • OR
		    • Places control switch for 2T41-B001A, in Run (P657) (may direct BOP to perform).
		    • Places 2T41-B001B, CRD Pump Room Cooler, in Off (P654) (may direct BOP to perform).
		    • Places 2T41-B001B, CRD Pump Room Cooler, in Auto (P654) (may direct BOP to perform).

		SIMULATOR OPERATOR, when dispatched to vent the CRD pump 2B, wait 3 minutes and notify the ATC the CRD pump 2B has been vented and the vent valves are closed AND the cooling water valves in step 7.1.3.1.2 are open. *Also ENSURE Event Trigger **EGC11-3** DELETES CRD 2A Overload alarm when CRD pump 2A is secured.*

	ATC	• Dispatches SO to confirm open the following valves and to vent the 2B CRD pump:
		  • 2C11-F118B, CRD Pump 2B Suction Valve
		  • 2C11-F114B, Suction Filter 2B Outlet Isolation
		  • 2C11-F115B, Suction Filter 2B Inlet Isolation
		• Starts 2C11-C001B, CRD Pump 2B, at P603.
		• Confirms flow control valve responds properly by controlling system flow between 30 gpm to 50 gpm.
		• Stops 2C11-C001A, CRD Pump 2A, at P603.
		• Dispatches SO to confirm closed 2C11-F117, CRD Suction Crosstie.
		• Confirms system parameters are in their normal ranges per NOTE in System Startup section of 34SO-C11-005-2.

		SIMULATOR OPERATOR enters the next event at the Chief Examiner's request.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 4

Event Description: Main Turbine Gland Seal Regulator valve fails closed.

Time	Position	Applicant's Actions or Behavior
5 Min		*SIMULATOR OPERATOR: At the direction of the Chief Examiner, ENTER malfunction mfN33_154 (**RB-4**).* ***NOTE**: If the F004 valve is NOT opened, it takes approximately 2.5 minutes for the turbine to trip on low vacuum.*
	ALL	Receives STEAM SEAL PRESS LOW, (650-125) annunciator. PRETREATMENT O/G RADIATION DOWNSCALE/INOP, (601-428) is already in.
	BOP	Responds to STEAM SEAL PRESS LOW, (650-125) annunciator • Confirms 2N33-R601A, Steam Seal Hdr Pressure Indicator, is below 1.5 psig, panel 2H11-P650. • Confirms OPEN 2N33-F003, Steam Seal Main Steam Feed Vlv. • Confirms CLOSED 2N33-F005, Unloading Bypass Vlv. • Confirms CLOSED 2N33-F008, Aux Steam Feed Vlv. • Throttles OPEN 2N33-F004, Steam Seal Feed Vlv Bypass, to bring steam seal pressure to between 2.5 PSIG and 4.5 PSIG. (**Critical Task**) (*Critical task is met when Steam Seal header pressure is restored to appropriate values prior to an automatic reactor scram on low RWL, approximately 10 minutes.*)

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 4		
Event Description:	Main Turbine Gland Seal Regulator valve fails closed.	

Time	Position	Applicant's Actions or Behavior

	BOP	• Sends an SO to the Steam Seal Feed Valve Controller to confirm > 20 # Air Inlet Pressure AND < 15 # Air Outlet Pressure.
		• Acknowledges annunciators received:
		  • PRETREATMENT O/G RADIATION DOWNSCALE/INOP, (601-428)
		  • INLET FLOW TO STACK HIGH, (N62-020) with recorder 2N62-R604 indicating flow increasing.
		  • May isolate the following valves on 2N62-P600 if O/G pressure increases to > 6 psig on 2N62-R600 IAW 34SO-N61-001-2:
		    • 2N62-F085, Holdup Line Drain
		    • 2N62-F030A, Cndsr/Sep A Drain
		    • 2N62-F030A, Cndsr/Sep A Drain
		  • Reopens valves when pressure is <6 psig

		SIMULATOR OPERATOR: If sent as the SO to check on Steam Seal Feed Valve Controller air pressure, wait 2 minutes and report air inlet is 2 psig and air outlet is 0.5 psig.
		SIMULATOR OPERATOR, at the direction of the Chief Examiner, PROCEEDS to next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 5		Page 10 of 26
Event Description:	One (1) Reactor Pressure ATTS trip unit causes a half scram and Control Rod 22-27 scrams in due to a blown fuse. The control rod fuse is repaired (Time Compress) and the rod is withdrawn.	

Time	Position	Applicant's Actions or Behavior
20 min		*At the Chief Examiner's direction, SIMULATOR OPERATOR, ENTER **(RB-5)** svoB21036 (final value of 1200 with ramp of 1000). **EGB21-26** will insert malfunctions mf60211154 and mfC12_26_22-27.*
	ALL	The following annunciators are received: REACTOR VESSEL HIGH PRESSURE TRIP, 603-105. REACTOR AUTO SCRAM SYSTEM A TRIP, 603-117. CRD ACCUMULATOR PRESS LOW OR LEVEL HIGH, 603-148. RMCS / RWM ROD BLOCK OR SYSTEM TROUBLE, 603-239 (when control rod 22-27 is selected). ROD DRIFT, 603-247. ECCS/RPS DIVISION I TROUBLE, 602-110.
	ATC	• Determines that reactor pressure has not changed. • Announces to SRO that a half-scram in the "A" channel has occurred due to an invalid high reactor pressure signal. • Informs the SRO that control rod 22-27 has scrammed in.
		*SIMULATOR OPERATOR: When dispatched to check the ATTS panel reactor pressure instruments, report **ONE MINUTE LATER** that 2B21-N678A has a red trip light and gross failure light illuminated.*
	SRO	• Dispatches personal to the ATTS panels to determine which reactor pressure instrument has tripped. • Contacts maintenance to repair ATTS card 2B21-N678A (2B21-N078A is transmitter). • Contacts maintenance to check and replace the fuse in the RPS "B" channel for control rod 22-27. • Notifies Rx Engineering or STA to check thermal limits if the SRO has not already contacted them.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 5

Event Description: One (1) Reactor Pressure ATTS trip unit causes a half scram and Control Rod 22-27 scrams in due to a blown fuse. The control rod fuse is repaired (Time Compress) and the rod is withdrawn.

Time	Position	Applicant's Actions or Behavior
		SIMULATOR OPERATOR: *When contacted as Reactor Engineering with the following question from 34AB-C11-004-2, "Contact Reactor Engineering to determine what thermal limits were exceeded during the event AND what recovery actions are necessary." Answer NO thermal limits have been exceeded.*
	SRO	Refers to the following Tech Specs: LCO 3.3.1.1, Reactor Protection System (RPS) Instrumentation, and determines that 2B21-N678A requires entry into RAS 3.3.1.1.A to place the channel in trip or the "A" trip system in trip in 12 hours.
		SIMULATOR OPERATOR: *AFTER the TS call is made **DELETES** mfC12_26_22-27; this will cause the scram light for the rod to extinguish.* *AND* *REPORTS as Maintenance that control rod 22-27 had a fuse blown, and after investigation, has been replaced.*
		SIMULATOR OPERATOR: *After being dispatched to repair ATTS card 2B21-N678A AND AFTER the SRO has determined the Tech Spec RAS,* *DELETE svoB21036 and mf60211154,* *THEN REPORT to the SRO that time compression has been used and that 2B21-N678A has been repaired and returned to service.*

Op-Test No.: 2019-301 Scenario No.: 12-6 Event No.: 5		Page 12 of 26
Event Description:	One (1) Reactor Pressure ATTS trip unit causes a half scram and Control Rod 22-27 scrams in due to a blown fuse. The control rod fuse is repaired (Time Compress) and the rod is withdrawn.	

Time	Position	Applicant's Actions or Behavior
		NOTE: *The following annunciators and actions may not be taken in the same sequence as listed below.*
	ATC	• Addresses annunciator, Reactor Auto Scram System A Trip, 603-117. • Confirm Scram Group A 1 2 3 4 lights for Trip System A on panel 2H11-P603 are extinguished. • Determine the cause of the trip. • Attempt to correct or bypass the cause of the trip. • Using the Process Computer obtains an OD-7 and determines that control rod movement has occurred. (May reset half scram before performing OD-7).
	ATC	• Resets RPS Channel A using 2C71-S5, Reactor Scram Reset switch, on panel 2H11-P603, per step 5.2.3 of 34AR-603-117-2. • Determines that section 4.7 of 34AB-C11-004-2 is required to be used to recover control rod 22-27.
	ATC	• Addresses annunciator ROD DRIFT, (603-247) • At panel 2H11-P603, confirms that one or more Rod Drift lights are illuminated on the full core display. • Selects the drifting rod and confirms that RPIS indicates the rod is not at an even reed switch position. • Notifies the Shift Supervisor and the STA. • Refers to 34AB-C11-004-2, Mis-positioned Control Rods, for recovery of drifting OR mis-positioned control rod. • When directed by the Shift Supervisor, resets the rod drift using the Rod Drift Alarm reset switch on Panel 2H11-P603.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 5

Event Description: One (1) Reactor Pressure ATTS trip unit causes a half scram and Control Rod 22-27 scrams in due to a blown fuse. The control rod fuse is repaired (Time Compress) and the rod is withdrawn.

Time	Position	Applicant's Actions or Behavior

	ATC	• Refers to Attachment 1 of 34AB-C11-004-2 for the proper actions to take.
		  • Are >4 rods mispositioned? NO
		  • Is the reactor sub-critical? NO
		  • Is reactor power < LPSP (21%)? NO
		  • Are Thermal Limits acceptable? YES
		  • Performs Action 1.
		  • Refer to Attachment 2 for restoration steps.

		SIMULATOR OPERATOR: When Reactor Engineering is notified for a recovery plan, provide the SRO with the marked-up copy of Attachment 2 of 34AB-C11-004-2.

	ATC	• Refers to Attachment 2 to recover the control rod.
		  • Withdraws the control rod to position 48 using the Rod Movement switch and Rod Out Notch Override switch (RONOR).
		  • Performs coupling check on control rod.

		SIMULATOR OPERATOR proceeds to the next event at the Chief Examiner's direction.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 6

Event Description: ADS Inadvertent initiation/Inhibit used. (**Critical Task**)

Time	Position	Applicant's Actions or Behavior
10 Mins		*At the Chief Examiner's direction, SIMULATOR OPERATOR, phone the BOP and instruct the BOP operator to stay on the line until told to hang up, THEN enters (**RB-6**) malfunction mfB21_131 Inadvertent ADS Initiation.*

	ALL	• Identifies ADS is about to initiate and observe the following alarms:
		  • AUTO BLOW DOWN TIMERS INITIATED, (602-306)
		  • AUTO BLOW DOWN RELAYS ENERGIZED, (602-318)

	BOP	• Acknowledges the alarms and reports them to the SRO.

	SRO	• May observe the ADS timer on SPDS begin counting down.
		
		  • Directs ATC to enter the following:
		    • AUTO BLOW DOWN TIMERS INITIATED, (602-306)
		    • AUTO BLOW DOWN RELAYS ENERGIZED, (602-318)
		    • 34AB-E10-001-2, Inadvertent Initiation of ECCS/RCIC
		    • May direct ATC to inhibit ADS

		NOTE: *The SRO may direct the ATC to inhibit ADS prior to pulling the 34AB-E10-001-2, "Inadvertent Initiation of ECCS/RCIC."*

	BOP	• Enters 34AB-E10-001-2
		
		  • Monitors plant parameters to determine extent of ECCS/RCIC actuations.
		
		  • Inhibits ADS using 2B21C-S7A & S7B, ADS Auto Logic Inhibit Switches, on 2H11-P602.
		  (**Critical Task**)
		  (*Critical task is met when BOTH ADS Inhibit switches are in INHIBIT prior to the ADS valves opening to prevent exceeding >100°F cooldown rate, RPV Pressure reaching approximately 355 psig.*)

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 6		Page 15 of 26
Event Description: ADS Inadvertent initiation/Inhibit used. (**Critical Task**)		
Time	**Position**	**Applicant's Actions or Behavior**
	BOP	• If ADS Timer on SPDS is approaching "Zero" (0), the ATC may depress the ADS Logic Timer pushbuttons prior to inhibiting ADS.
	SRO	• Dispatches Maintenance to determine problem with ADS logic.
		NOTE: *The SRO may enter TS 3.3.5.1. F & G and declare all ADS valves inoperable if the ADS instrumentation is NOT repaired in one hour. Without more information on failed instruments, a follow-up question to the SRO may be required to determine this TS call.*
	SRO	• While determining the extent of ADS failures, Enters TS 3.5.1.F and declares ALL ADS valves inop immediately. • With all ADS valves inop, be in Mode 3 in 12 hours and <150 psig RPV press in 36 hours.
		SIMULATOR OPERATOR, at the Chief Examiners direction, PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 7		
Event Description:	Leak in Drywell causes High Drywell pressure scram.	

Time	Position	Applicant's Actions or Behavior
15 Min		*SIMULATOR OPERATOR, at the Chief Examiner's direction, ENTERS: (**RB-7**) mfG31_242, f:2.5 r:1.0*
	ALL	Recognizes increasing Containment Pressure from the following alarms: • PRIMARY CNMT HIGH PRESSURE TRIP, (603-106). • PRIMARY CNMT PRESSURE HIGH, (603-115). • DRYWELL PRESSURE HIGH, (602-210).
		NOTE: *The SRO may direct the BOP to vent the Drywell, but there will NOT be time to complete the task before the LOCA signal is received.*
	SRO	• With Drywell pressure increasing and alarms PRIMARY CNMT PRESSURE HIGH, (603-115) and DRYWELL PRESSURE HIGH, (602-210), alarms being received, directs the ATC enter 34AB-C71-001-2, Scram Procedure, and Scram the reactor. • Assigns the ATC to perform RC-1. • Assigns the BOP operator to perform RC-2 and RC-3. • Enters 31EO-EOP-010-2, RC (Non ATWS) & 31EO-EOP-012-2, PC Control, EOP flow charts.
	ATC	• Performs RC-1 consisting of: • Inserts a manual scram. • Places the mode switch to SHUTDOWN. • Confirms all rods are inserted by observing full in lights, SPDS, or the RWM display. • Notifies SRO of rod position check. • Places SDV isolation valve switch to ISOLATE & confirms closed. • If NOT tripped, places the Recirc pumps at minimum speed. • Inserts SRMs and IRMs. • Shifts recorders to read IRMS, when required. • Ranges IRMS to bring reading on scale. • Notifies the SRO when the above actions are complete.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 7

Event Description: Leak in Drywell causes High Drywell pressure scram.

Time	Position	Applicant's Actions or Behavior

	BOP	• Performs RC-2 actions consisting of:
		• Confirms proper Level Control response:
		  • Checks ECCS Injection Systems and secure as necessary.
		  • Ensures FW Master Controller setpoint reduces to 9 inches and output reduces to 25% of previous value.
		  • IF set down does NOT auto function, then manually reduces FW Master Controller setpoint to approximately 9 inches.

	BOP	• Controls HPCI operation for level control by performing one or more of the following:
		  • Adjusts 2E41-R612, HPCI Flow Control, to the desired injection rate.
		  • Transfers the flow controller to manual and adjust its speed demand output to obtain the desired pump flow.
		  • Shutdown HPCI by:
		    • Depresses and holds the HPCI Turbine Trip pushbutton.
		    • When HPCI turbine has stopped, places 2E41-C002-3, HPCI Aux Oil Pump, in Pull-To-Lock.
		    • When HPCI TURBINE BRG OIL PRESS LOW alarm is received, releases the HPCI Turbine Trip push-button.

	BOP	• When feed flow is less than the capacity of the S/U level control valve (≈ 1.5 mlbm/hr), then:
		  • Opens 2N21-F125.
		  • Confirms 2C32-R619, FW S/U level control valve controller, in Auto, set at approximately 9 inches.
		  • Closes 2N21-F110.
		  • May attempt to restart the CRD pumps.
		  • May attempt maximize CRD flow IAW 34SO-C11-005-2.
		  • Controls RWL with the RCIC/HPCI/FW System.
		  • Notifies SRO if RWL gets outside assigned band.

Op-Test No.: 2019-301 Scenario No.: 12-6 Event No.: 7		
Event Description:	Leak in Drywell causes High Drywell pressure scram.	

Time	Position	Applicant's Actions or Behavior
		NOTE to EXAMINER: *SRVs actuate in LLS at 1120 psig and then control pressure between 850 - 990 psig.*

	BOP	• Performs RC-3 consisting of:
		  • Monitors RPV pressure.
		  • If necessary, allows RPV pressure to exceed 1074 psig then cycles any SRV to initiate LLS.
		  • If necessary, verifies LLS actuates at 1120 psig
		  • Maintains RPV Pressure between 1074 and 800 psig.
		  • Notifies SRO of pressure control system operation.

		NOTE: *The SRO may select a RPV pressure band which will lower the driving head of the leak while maintaining <100°F/hr RPV cool down (typically between 500 psig & 920 psig).*
	SRO	As time allows, may; • Direct the ATC to decrease reactor pressure to reduce the driving head of the leak using EHC pressure set. • Remove RWCU from service IAW 34AB-T23-002-2, Small Pipe Break in Primary Containment. • Direct PSW TB Isolation Valves, 2P41-F316A-D overridden IAW 34AB-P41-001-2, Loss of Plant Service Water.

	ATC	Enters Attachment 11 of 34SO-N30-001-2, Main Turbine, or 34GO-OPS-013-2, Normal Plant Shutdown, and at the DEHC panel computer, performs ONE of the following:
		1. Throttle Pressure Set
		  • Selects the **Control** → **psi- load** screen.
		  • Selects the *Ramp Rate* button.
		  • Enters a ramp rate.
		  • Selects the *Pressure* button.
		  • Enters desired target pressure.
		2. Bypass Valve Jack Positioning.
		  • **Control** BPV position by intermittently using the ***Raise*** / ***Lower*** buttons until BYPASS VALVE JACK STATUS changes to ***ACTIVE*** <u>AND</u> desired cooldown rate is established.

Op-Test No.: 2019-301 Scenario No.: 12-6 Event No.: 7		Page 19 of 26
Event Description:	Leak in Drywell causes High Drywell pressure scram.	

Time	Position	Applicant's Actions or Behavior
	ATC	Notifies the SRO that RPV Pressure is at the target psig.

	ATC	• Re-opens 2P41-F316A-D per 34AB-P41-001-2, Loss of PSW, Placard
		  • Places the A and B Isolation Override switches on the 2H11-P652 panel to OVERRIDE
		  • Fully opens 2P41-F316A or C and 2P41-F316B or D
		  • Throttles 2P41-F316C or A and 2P41-F316D or B to open while monitoring PSW Division 1 and 2 pressures on 2H11-P650 panel ensuring that PSW pressure remains above 80 psig

		SIMULATOR OPERATOR PROCEEDS to the next event.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 8		
Event Description:	RHR 2E11-F016A/B stuck closed requiring swapping to other loop of DW spray.	

Time	Position	Applicant's Actions or Behavior
5 Min	SRO	• Per the PC flowchart, verifies Torus level is <285 inches and directs an operator to place Torus Sprays in service.
	ATC	• Sprays the Torus per 34SO-E11-010-2 placard on the 2H11-P601 Panel as follows: • Places Cnmt Spray Vlv Cntl switch in the MANUAL position. • Starts RHR pump(s) in loop A/B, if NOT already running. • Opens 2E11-F028A/B. • Throttles Open 2E11-F027A/B. • Notifies SRO that RHR is in Torus Sprays.
		NOTE: *ONLY one loop of RHR will be placed in Torus Sprays. The flow is only 400 gpm.*
		SIMULATOR OPERATOR: *ENSURE Event Triggers* ***EGE11-4*** *&* ***EGE11-5*** *is ACTIVATED when the operator positions 2E11-F016A or B to open.*
	SRO	• When Torus pressure exceeds 11 psig, verifies that Torus Level is <215 inches, in the safe area of Graph 8 (DWSIL) and directs an operator to: • Place all DW cooling fans to OFF. • Place both Recirc pumps to PTL OFF.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 8		Page 21 of 26
Event Description:	RHR 2E11-F016A/B stuck closed requiring swapping to other loop of DW spray.	

Time	Position	Applicant's Actions or Behavior
	ATC	• Places both Recirc pumps to PTL OFF on panel 2H11-P602. • Places the following DW cooling fans control switches to OFF on panels 2H11-P654 & P657: • 2T47-B007B, Drywell Cooling Top Head Area Unit. • 2T47-B008B, Drywell Cooling Pedestal/Annular Area Unit. • 2T47-B009B, Drywell Cooling Recirc Pump Area Unit. • 2T47-C001B, Drywell Cooling Return Air Fan. • 2T47-C002B, Drywell Cooling Return Air Fan. • 2T47-B010B, Drywell Cooling EL 114 Unit. • 2T47-B007A, Drywell Cooling Top Head Area Unit. • 2T47-B008A, Drywell Cooling Pedestal/Annular Area Unit. • 2T47-B009A, Drywell Cooling Recirc Pump Area Unit. • 2T47-C001A, Drywell Cooling Return Air Fan. • 2T27-C002A, Drywell Cooling Return Air Fan. • 2T47-B010A, Drywell Cooling EL 114 Unit.
	SRO	• When all DW cooling fans are OFF <u>AND</u> both Recirc pumps are PTL OFF: • Directs an operator to spray the Drywell.
	ATC	• Sprays the Drywell per 34SO-E11-010-2 placard on the 2H11-P601 Panel as follows: • Places Cnmt Spray Vlv Cntl switch in the MANUAL position. • Starts RHR pump(s) in loop A (B), if NOT already running. • Opens 2E11-F021A or B. • Opens 2E11-F016A or B (ONE WILL NOT OPEN AND OPERATOR TRANSITIONS TO THE OTHER LOOP). • Informs SRO that the 2E11-F016A (or B) will NOT Open. • Opens 2E11-F021A or B. • Throttles Open 2E11-F016A(B) to ≥5000 gpm. • Confirms Drywell pressure is reducing. • Notifies SRO that RHR is in Drywell Sprays.

Op-Test No.: 2019-301	**Scenario No.: 12-6 Event No.: 8**	Page 22 of 26
Event Description:	RHR 2E11-F016A/B stuck closed requiring swapping to other loop of DW spray.	

Time	Position	Applicant's Actions or Behavior
	SRO	May direct the performance of 31EO-EOP-114-2, Preventing Injection Into The RPV From Core Spray And LPCI.
	BOP	• IAW 31EO-EOP-114-2, Preventing Injection Into The RPV From Core Spray And LPCI, the operator performs the following: • Closes RHR OUTBD INJ VLV, 2E11-F017A. • Closes RHR OUTBD INJ VLV, 2E11-F017B. • Notifies SSS to OPEN links & INSTALL jumpers for 2E11-F017A. • Notifies SSS to OPEN links & INSTALL jumpers for 2E11-F017B. • Confirms/CLOSES RHR OUTBD INJ VLV, 2E11-F017A. • Confirms/CLOSES RHR OUTBD INJ VLV, 2E11-F017B. • Confirms/CLOSES INBD DISCHARGE VLV, 2E21-F005A. • Confirms/CLOSES INBD DISCHARGE VLV, 2E21-F005B. • Trips Core Spray Pump 2A, 2E21-C001A. • Trips Core Spray Pump 2B, 2E21-C001B. • Notifies SRO 31EO-EOP-114-2 actions for RHR & CS are complete.
	SRO	• As time allows, directs H2/O2 Analyzers placed in service IAW 34SO-P33-001-2.
	ATC	• If directed, places H_2/O_2 Analyzers in service IAW 34SO-P33-001-2 or PLACARD by performing the following at 2H11-P700 panel: • Confirms closed 2P33-F605. • Places 2P33-S16, LOCA Override to BYPASS. • Places 2P33-S17, LOCA Override to BYPASS. • Confirms analyzers are running by either red Analyzer lights ILLUMINATED, or values indicated on the Primary Display of SPDS. • If Analyzers red light is off, depresses Channel A and Channel B Reset pushbuttons on 2H11-P700 panel. • Notifies SRO H_2/O_2 Analyzers are running.

Op-Test No.: 2019-301 **Scenario No.:** 12-6 **Event No.:** 8

Event Description: RHR 2E11-F016A/B stuck closed requiring swapping to other loop of DW spray.

Time	Position	Applicant's Actions or Behavior
		With Chief Examiners Permission, the scenario should be terminated when the crew has sprayed the Drywell with the other Loop of RHR.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-6** **Op-Test No.:** **2019-301**

Examiners: ______________ **Operators:** ______________ **SRO**

______________ ______________ **RO**

______________ ______________ **BOP**

Initiating Conditions:	Unit 2 is operating at ~4% RTP. 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written. RHR Loop B is operating in Torus Cooling Mode due to a recently performed HPCI surveillance.
Turnover	IAW 34SO-E11-010-2, Step 7.4.5.1, lower Torus level to 147.5 inches using RHR Loop 2B. After Torus water level has been lowered continue with the Startup IAW 34GO-OPS-001-2 at Step 7.4.1.

Summary:

- **Event 1:** Normal; Lower Torus level to 147.5 inches using RHR Loop 2B IAW 34SO-E11-010-2, Step 4.4.5.1.
- **Event 2:** Reactivity; Withdraw control rods to ~9% power and transfer the Reactor Mode Switch to Run.
- **Event 3:** Component; High amps on CRD pump 2A requiring swapping to standby pump IAW System Operating procedure.
- **Event 4:** Component; Turbine Gland Seal Reg Fails Closed resulting in a degrading condenser vacuum. The BOP will operate the bypass valve to restore steam seals on the Main Turbine prior to the reactor scramming on low RWL. (**Critical Task**)
- **Event 5:** Component; One (1) Reactor Pressure ATTS trip unit causes a half scram and a control rod to scram in due to a blown fuse. The control rod fuse is repaired (Time Compress) and the rod is withdrawn.
- **Event 6:** Instrument/TS; The ADS System will experience an inadvertent initiation which will require the BOP to place the ADS Inhibit switches to INHIBIT prior to the valves opening to prevent exceeding 100°F/hr cooldown rate or 110°F Torus water temperature. (**Critical Task**) ADS will be INOPERABLE.
- **Event 7:** Major; The plant experiences a RWCU pipe leak in Drywell causing a High Drywell pressure scram.
- **Event 8:** Component; When Torus pressure exceeds 11 psig, the operator will attempt to spray the Drywell but one RHR DW spray valve will NOT open. The other loop of RHR will be used to spray the Drywell. The first DW spray valve attempted will NOT open but the other loop of RHR DW spray valve will work.

NRC DRAFT

Facility: **E. I Hatch** **Scenario No.:** **12-6** **Op-Test No.:** **2019-301**

Critical Tasks

- Turbine Gland Seal Reg Fails Closed requiring 2N33-F005, Main Steam Feed Valve, open prior to the reactor scramming on low RWL. **(Event 4)**
- The ADS System will experience an inadvertent initiation which will require the BOP to place the ADS Inhibit switches to INHIBIT prior to the valves opening to prevent exceeding >100°F cooldown rate. **(Event 6)**

	ES 301-4 Attributes	Required	Actual	Items
1.	Total Malfunctions	5-8	6	1. High amps on CRD pump 2A. **(Event 3)** 2. Turbine Gland Seal Reg Fails Closed (**Event 4)** 3. ATTS Scram with CR blown fuse (**Event 5)** 4. ADS System inadvertent initiation (**Event 6)** 5. Leak in Drywell. (**Event 7)** 6. RHR 2E11-F016A/B stuck closed. (**Event 8)**
2.	Malfunctions After EOP Entry	1-2	1	1. RHR 2E11-F016A/B stuck closed. (**Event 8)**
3.	Abnormal Events	2-4	3	1. Turbine Gland Seal Reg Fails Closed (**Event 4)** 2. ATTS Scram with CR blown fuse (**Event 5)** 3. ADS System inadvertent initiation (**Event 6)**
4.	Major Transients	1-2	1	1. Leak in Drywell. (**Event 7)**
5.	EOPs entered, requiring substantive actions	1-2	2	1. RC Non-ATWS 2. PC
6.	EOPs contingencies entered with substantive actions	0-2	1	1. CP-1
7.	Preidentified Critical Tasks	≥ 2	2	1. Turbine Gland Seal Reg Fails Closed (**Event 4)** 2. ADS System inadvertent initiation (**Event 6)**

SHIFT TURNOVER

target ZERO Every day, every job, safely.	**Safety Focus**
UNIT 1 STATUS	
Plant Conditions:	• Unit 1 is operating at 100% RTP. • NO activities in progress.
Plant Conditions:	• Unit 2 is operating at ~4% RTP. • RHR Loop B is operating in Torus Cooling Mode due to a recently performed HPCI surveillance. • 2D11-K615B, Off gas Post treatment radiation monitor, failed Downscale, RAS written.
Protected Train: ☒ Division I ☐ Division II	**EOOS:** ☒ Green ☐ Orange ☐ Yellow ☐ Red
Scheduled evolutions:	☐ IAW 34SO-E11-010-2, lower Torus water level to 147.5 inches. ☐ After Torus water level has been lowered continue with the Startup IAW 34GO-OPS-001-2 at step 7.4.1.
Surveillances due this shift:	☐ NONE
Inop Equipment:	☐ 2D11-K615B, Off gas Post Treatment Radiation monitor has failed Downscale. IAW TS/TRM, I&C has placed 2D11-K615B in the trip condition while maintaining the function of 602-405, Post Treatment O/G Radiation Hi-Hi-Hi/Inop. A Caution Tag is attached to 2D11-K615B switch.
Active tagouts:	☐ NONE
Rod Configuration:	☐ See RWM Step 14

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR-SIM 1 RO & SRO-I

Title		**Version:**
UNSTICK A CONTROL ROD (ALTERNATE PATH FOR DRIFTING OUT)		1.0
Author: Anthony Ball	**Media Number:** 2019-301 CR-SIM 2	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date:** **5/17/2019**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	CR-SIM 1 2019-301

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	Unstick A Control Rod (Alternate Path for Drifting Out)
JPM NUMBER:	CR-SIM 1 2019-301
TASK STANDARD:	The task shall be completed when a SCRAM is inserted IAW 34AB-C11-004-2 due to a control rod drifting out while < LPSP.
TASK NUMBER:	001.010
OBJECTIVE NUMBER:	001.010.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 3.57

SRO 3.52

K/A CATALOG NUMBER: 201003A201

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.40

SRO 3.60

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 2**
	34GO-OPS-065-0 (Ver 15.4) 34AB-C11-003-2 (Ver 12.2) 34AB-C11-004-2 (Ver 4.3) 34AB-C71-001-2 (Ver 13.3)

REQUIRED MATERIALS:	**Unit 2**
	34GO-OPS-065-0 (Ver 15.4) 34AB-C11-003-2 (Ver 12.2) 34AB-C11-004-2 (Ver 4.3) Control Rod Movement Sequence Sheet

APPROXIMATE COMPLETION TIME: 15 Minutes

SIMULATOR SETUP: REFER TO SIMULATOR SETUP SHEET ON THE FOLLOWING PAGE

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to **7%, Xfer to RUN** or **SNAP 2019-301 JPM CR 1** and leave in **FREEZE**.

2. **INSERT the following MALFUNCTION & EVENT TRIGGER:**

MALF #	TITLE	FINAL VALUE	RAMP RATE	ACT. TIME
mfC12_22_46_23	Stuck Rod			00000
mfC12_24_46_23	Rod Drift Out			00000
EGC11-10	Deletes Stuck Rod insert Rod Drift			

3. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS:**

   A. Ensure that drive water dP is ~260 psid and stable

   B. Mark up the Pull Sheet in Step 15 (Student will be pulling the last six rods in this step).

4. **RUN SCENARIO FILE** and **EVENT TRIGGER** (current rev) **2019-301-11**

5. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.

6. **ESTIMATED** Simulator **SETUP TIME**: **15 Minutes**

NOTE: The simulator Operator will act as **second verifier** for rod movement and read the pre-job brief to the Operator.

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A normal plant startup is in progress per 34GO-OPS-001-2, "Plant Startup, and is currently at Step 7.4.3.
2. Rod withdrawal to achieve 6-7% on the APRMs is in progress.
3. There are 6 rods left to withdraw in Step 15 of the Pull Sequence to complete that step.
4. Rod Worth Minimizer is operable and has been loaded with the correct movement sequence, which has been approved by the Reactor Engineering Supervisor.
5. Permission has been granted to use Notch Override in this group of rods.

INITIATING CUES:

Perform Control Rod manipulations IAW Step 15 starting with Control Rod 46-23 of the Control Rod Movement Sheets.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:________

1.	Operator identifies the procedure needed to perform the task.	Operator has identified the correct procedure as 34GO-OPS-065-0.	
2.	Operator reviews the procedure's precautions and limitations.	Operator has reviewed the precautions and limitations.	
3.	Operator identifies the materials that are required.	Operator has identified the required materials and where to obtain them.	

PROMPT: **WHEN** the Operator addresses an approved copy of the Control Rod Movement Sequence Sheet, **GIVE** the Operator the Control Rod Movement Sequence Sheet.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**4.	Operator attempts to withdraw control rod 46-23 to it's withdraw limit and recognizes that control rod 46-23 has not moved. (IAW 34GO-OPS-065)	At panel 2H11-P603, ROD MOVEMENT CONTROL switch is used to withdraw the rod and the operator has RECOGNIZED that rod position indicator for rod 46-23 indicates "12" on the Four-Rod Display and/or RWM.	
5.	Operator enters the abnormal procedure for inability to move a control rod.	Operator OBTAINS 34AB-C11-003-2, "Inability to Move a Control Rod."	
6.	Operator confirms that the inability to move the rod is NOT caused by a rod block. (34AB-C11-003-2 step 1)	At panel 2H11-P603, the Operator VERIFIES: White select light for the affected rod is illuminated. White ROD OUT permissive light is illuminated. Annunciator RMCS/RWM ROD BLOCK OR SYS TROUBLE (603-239) is clear.	
7.	Operator determines if rod is at position "00" or partially/fully withdrawn. (34AB-C11-003-2 step 2)	At panel 2H11-P603, the Operator VERIFIES: Rod is not at position "00".	
8.	Operator determines if drive water pressure less than 600 psid. (34AB-C11-003-2 step 31)	At panel 2H11-P603, the Operator VERIFIES: Drive water pressure < 600 psid.	

(** Indicates critical step)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: The Operator may attempt to move the control rod again to verify the proper RMCS and CRD Drive flow indications. However, the Operator may accomplish this step by having observed rod motion on the previous rod movements.

9.	Operator confirms the proper operation of the CRD Hydraulic System. (34AB-C11-003-2 step 3)	At panel 2H11-P603, the Operator VERIFIES proper indication for: CLG WTR FLOW 2C11-R605 CHG WTR PRESS 2C11-R601 CLG WTR dP 2C11-R603 DR WTR dP 2C11-R602	
10.	Operator confirms that the RMCS timer is operating properly. (34AB-C11-003-2 step 3)	At panel 2H11-P603, the Operator VERIFIES the proper indications on the ROD IN, ROD OUT, and ROD SETTLE lights.	
11.	Operator confirms drive water insert and withdraw flows. (34AB-C11-003-2 step 3)	At panel 2H11-P603, the Operator VERIFIES: Drive water insert flow is approximately 4 gpm. Drive water withdraw flow is approximately 2 gpm.	

NOTE: **(EVENT TRIGGER EGC11-10),** when Drive Water dP is increased to 300 psig, **mfC12_22_46_23** will be **DELETED** AND **mfC12_24_46_23** will be **INSERTED**. This will allow the operator to move the rod at 260 psid and begin to drift out.

****12.**	Operator increases CRD drive water pressure to 300 psid. (34AB-C11-003-2 step 19)	At panel 2H11-P603, the Operator ADJUSTS DRIVE PRESS CNTL VLV 2C11-F003 to obtain 300 psid as indicated on DR WTR dP 2C11-R602.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

ALTERNATE PATH STARTS HERE
(Step 15)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
****13.**	Withdraw the control rod to position 14 using the Rod Movement Control switch. (34AB-C11-003-2 steps 20 and 5)	At panel 2H11-P603, the ROD MOVEMENT CONTROL switch is used for rod withdrawal to position 14. The rod continues to move past position 14.	
14.	Operator diagnoses the rod drifting.	At panel 2H11-P603, the Operator acknowledges the following indications: Rod Drift Light Illuminated ROD DRIFT, 603-247 ROD OUT BLOCK, 603-238 RMCS/RWM ROD BLOCK OR SYSTEM TROUBLE, 603-239	
15.	Operator enters the abnormal procedure for a mispositioned control rod. (34AB-C11-004-2 step 1.0)	Operator OBTAINS 34AB-C11-004-2, "Mispositioned Control Rod."	
16.	Operator verifies reactor power is < LPSP (21.0%) (34AB-C11-004-2 step 4.4)	At panel 2H11-P603, the Operator VERIFIES: APRMs indicating < 21.0%	
****17.**	Operator enters 34AB-C71-001-2, Scram Procedure (34AB-C11-004-2 step 4.4)	At panel 2H11-P603, the Operator inserts a manual scram.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

PROMPT: **WHEN** the Operator addresses resuming the scram actions, **INFORM** the Operator that another Operator will continue with the Scarm Procedure.

END TIME: ________

NOTE: The terminating cue shall be given to the Operator when:

- Operator completes step 17 of this JPM.
- With NO reasonable progress, the Operator exceeds double the allotted time.
- An automatic scarm ocurrs.

Summary of JPM Attributes

JPM CR-SIM 1 2019-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	4

Step 4 Recognizes 46-23 fail	Proper rod operation.
Step 12 Adjust dP to 300 psig	Required to move control rod.
Step 13 Withdraws 46-23	Proper rod in withdraw sequence.
Step 17 Inserts manual scram	Places plant in safe shutdown condition.

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	17
Time to Perform JPM	<45 min	15 min

Normal / Faulted / Alternate Path

Alternate Path — Once Control rod 46-23 is unstuck it will begin to drift requiring entry into 34AB-C11-004-2, directing a manual scram IAW 34AB-C71-001-2.

Setting (administered)

Simulator

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A normal plant startup is in progress per 34GO-OPS-001-2, “Plant Startup, and is currently at Step 7.4.3.
2. Rod withdrawal to achieve 6-7% on the APRMs is in progress.
3. There are 6 rods left to withdraw in Step 15 of the Pull Sequence to complete that step.
4. Rod Worth Minimizer is operable and has been loaded with the correct movement sequence, which has been approved by the Reactor Engineering Supervisor.
5. Permission has been granted to use Notch Override in this group of rods.

INITIATING CUES:

Perform Control Rod manipulations IAW Step 15 starting with Control Rod 46-23 of the Control Rod Movement Sheets.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR/SIM 2 ALL

Title		**Version:**
WITH AN EMERGENCY DEPRESS REQUIRED, TERMINATE AND PREVENT CONDENSATE/FEEDWATER		1.0
Author: Arthur Genereux	**Media Number:** 2019-301 CR-SIM 2	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date:** **5/17/2019**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 CR-SIM 2

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	**WITH AN EMERGENCY DEPRESS REQUIRED, TERMINATE AND PREVENT CONDENSATE/FEEDWATER**
JPM NUMBER:	2019-301 CR-SIM 2
TASK STANDARD:	The task shall be complete when the operator has terminated and prevented the Condensate and Feedwater injection systems per 31EO-EOP-113-2 for an emergency depressurization.
TASK NUMBER:	201.101
OBJECTIVE NUMBER:	201.101.A

PLANT HATCH JTA IMPORTANCE RATING:

RO

SRO

K/A CATALOG NUMBER: 295037EA202

K/A CATALOG JTA IMPORTANCE RATING:

RO 4.10

SRO 4.20

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 2**
	31EO-EOP-017-2 (current version) 31EO-EOP-113-2 (current version)

REQUIRED MATERIALS:	**Unit 2**
	31EO-EOP-113-2 (current version)

APPROXIMATE COMPLETION TIME: 15 Minutes

SIMULATOR SETUP: REFER TO SIMULATOR SETUP SHEET ON THE FOLLOWING PAGE

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to (75%) **IC #111 or SNAP 612** and leave in **FREEZE**.

2. **INSERT** the following **MALFUNCTIONS:**

MALF #	TITLE	FINAL VALUE	RAMP RATE	ACT. TIME
mfC11_211	Scram Discharge Volume ATWS (Var)	55	1000	00000
mfN37_134	All Bypass Valves Fail Closed			00000
mfN30_122	Main Turbine Trip			5

3. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS OR RUN SCENARIO FILE** and **EVENT TRIGGER** (current rev) **JPM CR-SIM 2 2019-301**

   A. Ensure Malfunction mfC11_211 is active.
   B. Activate Malfunction mfN30_122.
   C. Inhibit ADS.
   D. Inject SBLC.
   E. **Perform RC-2 (LEAVE 2N21-F110 ~10 SECONDS OPEN.**
   F. Ensure HPCI is NOT running and Aux Oil Pump is in PULL TO LOCK OFF.

4. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.

5. **ESTIMATED** Simulator **SETUP TIME**: **15 Minutes**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An ATWS condition exists and Reactor power is greater than 5%.
2. RWL is above TAF.
3. SRVs are open and controlling pressure with Low-Low Set.
4. 31EO-EOP-017-2 (CP-3) is in progress.

INITIATING CUES:

The SS directs you, as an extra operator, to Terminate and prevent Condensate and Feedwater injection per 31EO-EOP-113-2 for an Emergency Depress.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

PROMPT: **IF** the operator addresses RHR and Core Spray Systems (i.e. Jumpers/ Links), as the Shift Supervisor, **INFORM** the operator that another operator will terminate and prevent those systems.

**1.	Operator trips Feedwater Pump 2B (RFP). (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has DEPRESSED both 2B RFP “RESET-TRIP” push buttons, red trip light ILLUMINATED while in TRIP and RFPT 2B TRIP annunciator ILLUMINATED.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**2.	Operator trips 2A Condensate Booster Pump (CBP). (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED 2N21-C002A, CBP, to the TRIP position, then to the Pull-To-Lock (PTL) position, green light ILLUMINATED.	
**3.	Operator trips 2B Condensate Booster Pump. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED 2N21-C002B, CBP to the TRIP position, then to the PTL position, green light ILLUMINATED.	
**4.	Operator trips 2C Condensate Booster Pump. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED 2N21-C002C, CBP, to the TRIP position, then to the PTL position, green light ILLUMINATED.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: **FOR STEPS 5, 6 & 7**, it is permissible for the operator to chose which Condensate Pump will be left in service, and therefore, will ONLY perform TWO (2) of the THREE (3) CRITICAL steps below.

**5.	Operator trips 2A Condensate Pump. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED 2N21-C001A, Condensate Pump, to the TRIP position, then to the PTL position, green light ILLUMINATED.	
**6.	Operator trips 2B Condensate Pump. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED 2N21-C001B, Condensate Pump, to the TRIP position, then to the PTL position, green light ILLUMINATED.	
**7.	Operator trips 2C Condensate Pump. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED 2N21-C001C, Condensate Pump, to the TRIP position, then to the PTL position, green light ILLUMINATED.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
8.	Confirms 2N21-F110, S/U LEVEL CONTROL BYPASS, is closed. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator CONFIRMS 2N21-F110, S/U Level Control Bypass, green light ONLY ILLUMINATED.	
****9.**	Closes 2N21-F125, S/U LEVEL CONTROL ISOL. (31EO-EOP-113-2 step 3.2.1)	At panel 2H11-P650, the operator has PLACED the control switch for 2N21-F125, S/U Level Control Isol, to the CLOSE position, green light ILLUMINATED.	

PROMPT: **IF** the operator addresses System realignment, as the Shift Supervisor, **INFORM** the operator that it is not desired at this time.

NOTE: **IF** the operator trips ALL Condensate pumps; the JPM critical task WILL BE MET; however, followup questions may be necessary concerning procedure use.

END TIME:__________

NOTE: The terminating cue shall be given to the operator when any one of the following is met:

- After JPM step #9 is complete.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

EVALUATOR – **PICK UP** the Initiating Cue sheet.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

Summary of JPM Attributes

JPM CR-SIM 2 2019-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	8

Step 1 Trip 2B RFP — Terminates high pressure feed.
Step 2 Trip 2A CBP — Reduces low pressure feed.
Step 3 Trip 2B CBP — Reduces low pressure feed.
Step 4 Trip 2C CBP — Reduces low pressure feed.
Step 5 Trip 2A CP — Reduces low pressure feed.
Step 6 Trip 2B CP — Reduces low pressure feed
Step 7 Trip 2C CP — Reduces low pressure feed
Step 9 Close 2N21-F125 — Isolates feedwater injection.

NOTE: **FOR STEPS 5, 6 & 7**, it is permissible for the operator to chose which Condensate Pump will be left in service, and therefore, will ONLY perform TWO (2) of the THREE (3) CRITICAL steps below.

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	9
Time to Perform JPM	<45 min	10 min

Normal / Faulted / Alternate Path

Normal Path

Setting (administered)

Simulator

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An ATWS condition exists and Reactor power is greater than 5%.
2. RWL is above TAF.
3. SRVs are open and controlling pressure with Low-Low Set.
4. 31EO-EOP-017-2 (CP-3) is in progress.

INITIATING CUES:

The SS directs you, as an extra operator, to Terminate and prevent Condensate and Feedwater injection per 31EO-EOP-113-2 for an Emergency Depress.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR/SIM 3 RO & SRO-I

Title EMERGENCY DEPRESS THE REACTOR USING THE HEAD VENTS/DRYWELL		**Version:** 1.0
Author: Arthur Genereux	**Media Number:** 2019-301 CR-SIM 3	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date:** **5/17/19**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 CR-SIM 3

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/17/19	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	**EMERGENCY DEPRESS THE REACTOR USING THE HEAD VENTS/DRYWELL**
JPM NUMBER:	2019-301 CR-SIM 3
TASK STANDARD:	The task shall be complete when the operator has initiated the emergency depress process with the Head Vents/Drywell Coolers, per 31EO-EOP-108-2.
TASK NUMBER:	201.098
OBJECTIVE NUMBER:	201.098.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 4.57

SRO 3.66

K/A CATALOG NUMBER: 295025G2.1.23

K/A CATALOG JTA IMPORTANCE RATING:

RO 2.9

SRO 3.0

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 2**
	31EO-EOP-108-2 (Ver 5.13) 34SO-T47-001-2 (Ver 4.2) 34SO-T48-002-2 (Ver 27.5)

REQUIRED MATERIALS:	**Unit 2**
	31EO-EOP-108-2 (Ver 5.13) 34SO-T47-001-2 (Ver 4.2) 34SO-T48-002-2 (Ver 27.5)

APPROXIMATE COMPLETION TIME: 15 Minutes

SIMULATOR SETUP: REFER TO SIMULATOR SETUP SHEET ON THE FOLLOWING PAGE

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to SNAP 613 OR **IC #113** and leave in **FREEZE**.

2. **INSERT** the following **MALFUNCTIONS:**

MALF #	TITLE	FINAL VALUE	DELAY TIME	ACT. TIME
mfB21_129B	Main Steam Relief Valve B Fails Stuck			00000
mfB21_129C	Main Steam Relief Valve C Fails Stuck			00000
mfB21_129D	Main Steam Relief Valve D Fails Stuck			00000
mfB21_129E	Main Steam Relief Valve E Fails Stuck			00000
mfB21_129F	Main Steam Relief Valve F Fails Stuck			00000
mfB21_129G	Main Steam Relief Valve G Fails Stuck			00000
mfB21_129H	Main Steam Relief Valve H Fails Stuck			00000
mfB21_129K	Main Steam Relief Valve K Fails Stuck			00000
mfB21_129L	Main Steam Relief Valve L Fails Stuck			00000
mfB21_129M	Main Steam Relief Valve M Fails Stuck			00000

3. **INSERT** the following **OVERRIDES (SVO) & (IO):**

SVO #	DESCRIPTION	FINAL VALUE	RAMP RATE	ACT. TIME
svoT48140	Water Level in Torus	115	100	00000
diB21-F013A	Auto Relief SRV A	AUTO		

4. **INSERT** the following **REMOTE FUNCTIONS:**

REM #	DESCRIPTION	STATUS
rfP64_330	Drywell Chillers B006A & B LOCA/LOSP Trip Links	BYPASS
rfP64_331	Drywell Chillers B006B LOCA/LOSP Trip Links	BYPASS

5. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS:**

A. On 2H11-P700 place the key switch for the Drywell Chillers to Override
B. On 2H11-P654 and P657, place keyswitchs for Drywell Fans to Override
C. Perform RC-1, RC-2, and TC-1 and RWL to the normal band.
D. Reset the Group 2 isolation.
E. Prevent a further Group 2 by starting RCIC to maintain level >3" (SRV A will be cycling)
F. Close the MSIVs
G. Place ALL SRV switches to OPEN
H. Place HPCI in service in Auto, injecting at 750 gpm.
The SIMULATOR OPERATOR WILL CONTROL HPCI INJECTION TO MAINTAIN +3 TO +50 INCHES RWL.
I. Place SBGT in service with suction from Rx. Bldg & RF
J. Acknowledge annunciators.

6. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.

7. **ESTIMATED** Simulator **SETUP TIME**: **20 Minutes**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A condition exist that requires the Shift Supervisor to Emergency Depress the Reactor.
2. 31EO-EOP-015-2 (CP-1) is in progress.
3. An attempt was made to Emergency Depress with the SRVs, but they have failed to open.
4. Other methods of Alternate Emergency Depress have been unsuccessful.
5. Drywell Chillers and Fans have been placed in service per 34SO-P64-001-2 with the LOCA trips overridden.
6. The Group 2 isolation has been reset.
7. Standby Gas Treatment System is running with suction from the Reactor Building & Refueling Floor per 34SO-T46-001-2.

INITIATING CUES:

Depressurize the Reactor using the Head Vents/Drywell Coolers per 31EO-EOP-108-2.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

1.	Obtain the procedure needed to perform the task.	Operator obtains 31EO-EOP-108-2.	
2.	Place all available DW Chillers and Fans in service (31EO-EOP-108-2 step 3.9.1 and 3.9.2)	Recognizes that all DW Chillers and Fans in service from initial conditions or by observing red lights illuminated on 2H11-P654 and 2H11-P657.	
3.	Obtain the procedure needed to perform the task. (31EO-EOP-108-2 step 3.9.3)	Operator obtains 34SO-T48-002-2 or placard to vent the drywell.	

NOTE: Only one loop is critical and needs to be vented.
Steps 4-6 are for the "A" side and steps 7-9 are for the "B" side.

NOTE: The operator may use the placard or 34SO-T48-002-2 to vent the Drywell.

****4.**	OPEN 2T48-F334A, Drywell Vent Isol Vlv. (34SO-T48-002-2 step 4.1.3.2.a.1)	At 2H11-P657, the operator places the control switch for 2T48-F334A, Drywell Vent Isol Vlv to OPEN.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**5.	OPEN 2T48-F335A, Drywell Vent Isol Vlv. (34SO-T48-002-2 step 4.1.3.2.a.2)	At 2H11-P657, the operator places the control switch for 2T48-F335A, Drywell Vent Isol Vlv to OPEN.	
**6.	OPEN 2T48-F336A, Drywell Vent Flow Cntl Vlv. (34SO-T48-002-2 step 4.1.3.2.a.3)	At 2H11-P657, the operator increases the controller output on 2T48-R615A, Drywell Flow Controller for F336A with demand greater than zero.	
**7.	OPEN 2T48-F334B, Drywell Vent Isol Vlv. (34SO-T48-002-2 step 4.1.3.2.b.1)	At 2H11-P654, the operator places the control switch for 2T48-F334B, Drywell Vent Isol Vlv to OPEN.	
**8.	OPEN 2T48-F335B, Drywell Vent Isol Vlv. (34SO-T48-002-2 step 4.1.3.2.b.2)	At 2H11-P654, the operator places the control switch for 2T48-F335B, Drywell Vent Isol Vlv to OPEN.	
**9.	OPEN 2T48-F336B, Drywell Vent Flow Cntl Vlv. (34SO-T48-002-2 step 4.1.3.2.b.3)	At 2H11-P654, the operator increases the controller output on 2T48-R615B, Drywell Flow Controller for F336B with demand greater than zero.	
10.	At 2H11-P602, Place the following pump control switches to PULL TO LOCK: (31EO-EOP-108-2 step 3.9.4) • D/W Equipment Drain pump 2G11-C006A • D/W Equipment Drain Pump 2G11-C006B • D/W Floor Drain Pump 2G11-C001A • D/W Floor Drain Pump 2G11-C001B	At 2H11-P602, DRYWELL SUMP CONTROLS, the operator places the following pump control switches are in PULL TO LOCK: • D/W Equipment Drain pump 2G11-C006A • D/W Equipment Drain Pump 2G11-C006B • D/W Floor Drain Pump 2G11-C001A • D/W Floor Drain Pump 2G11-C001B	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**11.	At 2H11-P602, OPEN Reactor Head Vent valve, 2B21-F004. (31EO-EOP-108-2 step 3.9.5)	At 2H11-P602, RX HEAD VENTS, VENT VLV, 2B21-F004 is OPEN, red light ONLY illuminated.	
**12.	At 2H11-P602, OPEN Reactor Head Vent valve, 2B21-F003. (31EO-EOP-108-2 step 3.9.5)	At 2H11-P602, RX HEAD VENTS, VENT VLV, 2B21-F003 is OPEN, red light ONLY illuminated.	

PROMPT: **IF** system restoration is addressed by the operator, as the Shift Supervisor, **INFORM** the operator that system restoration is not desired at this time.

END TIME:__________

NOTE: The terminating cue shall be given to the operator when:

- When the operator completes step 12.
- With NO reasonable progress, the operator exceeds double the allotted time.

TERMINATING CUE: We will stop here.

(Indicates critical step)**

Summary of JPM Attributes

JPM CR-SIM 3 2019-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	8

Step 4 Open 2T48-F334A — Aligns Drywell Vent Path.
Step 5 Open 2T48-F335A — Aligns Drywell Vent Path.
Step 6 Open 2T48-F336A — Aligns Drywell Vent Path.
Step 7 Open 2T48-F334B — Aligns Drywell Vent Path.
Step 8 Open 2T48-F335B — Aligns Drywell Vent Path.
Step 9 Open 2T48-F336B — Aligns Drywell Vent Path.
Step 11 Open 2B21-F004 — Aligns RPV Vent Path
Step 12 Open 2B21-F003 — Aligns RPV Vent Path

NOTE: Only one loop is critical and needs to be vented.
Steps 4-6 are for the "A" side and steps 7-9 are for the "B" side.

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	8
Time to Perform JPM	<45 min	15 min

Normal / Faulted / Alternate Path

Normal Path

Setting (administered)

Simulator

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A condition exist that requires the Shift Supervisor to Emergency Depress the Reactor.
2. 31EO-EOP-015-2 (CP-1) is in progress.
3. An attempt was made to Emergency Depress with the SRVs, but they have failed to open.
4. Other methods of Alternate Emergency Depress have been unsuccessful.
5. Drywell Chillers and Fans have been placed in service per 34SO-P64-001-2 with the LOCA trips overridden.
6. The Group 2 isolation has been reset.
7. Standby Gas Treatment System is running with suction from the Reactor Building & Refueling Floor per 34SO-T46-001-2.

INITIATING CUES:

Depressurize the Reactor using the Head Vents/Drywell Coolers per 31EO-EOP-108-2.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR-SIM 4 ALL

Title		Version:
OVERRIDE THE MSIVS IN AN EMERGENCY (Alternate Path for MSL Break)		1.0
Author: Arthur Genereux	**Media Number:** 2019-301 CR-SIM 4	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date:** **5/17/19**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	CR-SIM 4 2019-301

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/17/19	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	**OVERRIDE THE MSIVS IN AN EMERGENCY (Alternate Path for MSL Break)**
JPM NUMBER:	2019-301 CR-SIM 4
TASK STANDARD:	The task shall be completed when the MSIVs have been opened per 31EO-EOP-111-2 and then reclosed due to MSL break in the Reactor Building.
TASK NUMBER:	014.014
OBJECTIVE NUMBER:	014.014.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 3.85

SRO 3.16

K/A CATALOG NUMBER: 239001A4.01

K/A CATALOG JTA IMPORTANCE RATING:

RO 4.20

SRO 4.00

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 2**
	31EO-EOP-111-2 (Ver 1.6) 31EO-EOP-011-2 (Ver 12.1) 34AB-T22-001-2 (Ver 0.6) 34AR-603-223-2 (Ver 3) 34AR-603-224-2 (Ver 3))

REQUIRED MATERIALS:	**Unit 2**
	31EO-EOP-011-2 (Ver 12.1)

APPROXIMATE COMPLETION TIME: **15** Minutes

SIMULATOR SETUP: REFER TO SIMULATOR SETUP SHEET ON THE FOLLOWING PAGE

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to **IC #113 or Snap 614** and leave in **FREEZE**.
2. **ACTIVATE THE FOLLOWING EVENT TRIGGERS:**

Trigger #	DESCRIPTION	CONDITIONS
EGB21-17	Delete mf60321350 Group I System A Trip	diA71B-S32.aivToPanel<1
EGB21-18	Delete mf60321351 Group I System B Trip	diA71B-S33.aivToPanel<1
EGB21-30	Inserts mfB21_224 f:1 r:1000 d:0	Red lights on Inbd MSIVs on

3. **INSERT** the following **MALFUNCTIONS:**

MALF #	TITLE	FINAL VALUE	RAMP RATE	ACT. TIME
mfC11_211	Scram Discharge Volume ATWS (Var)	20	100	00000
mfE41_235A	HPCI Fails to Auto Start on Low Level			00000
mfE41_235B	HPCI Fails to Auto Start on Hi Drywell Press			00000
mf60321383	Spur Ann -- LOW CONDENSER VACUUM A BYPASS			00000
mf60321384	Spur Ann -- LOW CONDENSER VACUUM B BYPASS			00000
mf60321350	Group I System A Trip			00000
mf60321351	Group I System B Trip			00000

4. **INSERT** the following **SIMULATOR VALUE OVERRIDES (SVO):**

SVO #	DESCRIPTION	FINAL VALUE	RAMP RATE	ACT. TIME
svoB21005	LT-N081A Group I/II Isolation	-110	100	00000
svoB21006	LT-N081B Group I/II Isolation	-110	100	00000

5. **INSERT** the following **REMOTE FUNCTIONS:**

REM #	DESCRIPTION	STATUS
rfN11045	SJAE A Steam	CLOSE
rfB21148	Grp 1 Low Rx Water Level Bypass	ORIDE
rfC71279	Group 1 Isolation Oride Jumpers	ORIDE

6. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS:**

   A. Take simulator out of FREEZE and perform RC-1, RC-2 and TC-1.
   B. Place 2N11-F004A & F004B control switches in CLOSED & ENSURE they are CLOSED.
   C. Place 2N33-F003 control switch in CLOSED & ENSURE it is CLOSED
   D. Place the MSIV control switches in CLOSED.
   E. Enter Remote Functions WHEN Torus temperature reaches 109°F or greater.
   F. Inhibit ADS and inject SBLC.
   G. Acknowledge annunciators.

7. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.

8. **ESTIMATED** Simulator **SETUP TIME**: **15 Minutes**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. The Condenser Low Vacuum and Low RWL isolations have been bypassed.
2. Main Condenser is in operation with Circ Water and Condensate Systems in operation.
3. An ATWS condition exists and 31EO-EOP-011-2 (RCA) is in progress.
4. EHC is in operation.

INITIATING CUES:

Open the MSIVs to re-establish Main Condenser as the heat sink using 31EO-EOP-111-2.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:_________

1.	Place MSIV Control Switches to CLOSED. (31EO-EOP-111-2 step 3.1.1)	At panel 2H11-P601, confirms the following OUTBOARD MSIV switches are in CLOSED: MSIV 2B21-F028A MSIV 2B21-F028B MSIV 2B21-F028C MSIV 2B21-F028D	
2.	Place MSIV Control Switches to CLOSED. (31EO-EOP-111-2 step 3.1.1)	At panel 2H11-P602, confirms the following INBOARD MSIV switches are in CLOSED: MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D	
3.	Confirm A & B RFPTs are tripped. (31EO-EOP-111-2 step 3.1.2) and (31EO-EOP-111-2 step 3.1.3)	At panel 2H11-P650, Operator has determined BOTH RFPTs are TRIPPED by: Checking annunciators(650-325 & 326) are ILLUMINATED	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

PROMPT: **IF** the operator addresses isolation bypasses, as the Shift Supervisor, **INFORM** the operator that the Condenser Low Vacuum and Low Water Level isolations are bypassed.

**4.	Reset Group I Isolation. (31EO-EOP-111-2 step 3.1.6)	The GR ISOL RESET switch has been taken to GR I RESET position at panels 2H11-P601 and 2H11-P602.	
5.	Bypass the High Flow isolation on 2P70-F004 and F005, if necessary. (31EO-EOP-111-2 step 3.1.7)	Operator has determined it is NOT necessary to bypass the High Flow Isolation by: Checking annunciators OR Checking INBD INLET ISOL 2P70-F004 and F005 red lights illuminated on panel 2H11-P700.	

NOTE: It is acceptable for operator to have the High Flow Isolation bypassed. **IF** operator decides to bypass the High Flow Isolation, as the Shift Support Supervisor, **INFORM** the operator that it has been bypassed.

6.	Confirm closed Inboard MSIVs. (31EO-EOP-111-2 step 3.1.8)	At panel 2H11-P602, the following INBOARD MSIVs are CLOSED, green light illuminated: MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D.	

**7.	Open Outboard MSIVs. (31EO-EOP-111-2 step 3.1.9)	At panel 2H11-P601, the following switches are in OPEN SLO TEST, red light illuminated: MSIV 2B21-F028A MSIV 2B21-F028B MSIV 2B21-F028C MSIV 2B21-F028D	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
8.	Check differential pressure across Inboard MSIVs. (31EO-EOP-111-2 step 3.1.10)	Operator has determined differential pressure is greater than 200 psid using: REACTOR PRESSURE indicator A(B,C) 2C32-R605A(B,C) on panel 2H11-P603 AND MAIN STEAM PRESS "A"("B") 2N32-R654A(B) indicator on Turbine EHC Panel or recorder PRESS TO STOP VLVS 1 & 4 2N11-R601 OR ***Monitor*** → ***steam pressure*** 2N32-K4001A OR 2N32-K4001B.	

NOTE: Any valid indication of Reactor Pressure and Steam Line Pressure can be used for Step 8.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
9.	Confirm/Close valves 2N11-F001A & B. (31EO-EOP-111-2 step 3.1.11)	The operator has ADDRESSED contacting a SO to verify/close SJAE 2A(2B) MAIN STEAM ISOL VALVE at panel 2H21-P216.	

PROMPT: **WHEN** the operator addresses valves 2N11-F001A and B, as the SO, **INFORM** the operator that the valves 2N11-F001A & B are closed.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
10.	Confirm the following valves are closed: 2N11-F004A 2N11-F004B 2N33-F003 (31EO-EOP-111-2 step 3.1.11)	At panel 2H11-P650, the following valves are CLOSED, green light illuminated: 2ND STG A & B MSR RHTR STM SPLY VLV 2N11-F004A 2ND STG C & D MSR RHTR STM SPLY VLV 2N11-F004B MAIN STM FEED VLV 2N33-F003.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**11.	Open the following valves: 2B21-F016 2B21-F019 (31EO-EOP-111-2 step 3.1.12)	The following valves are OPEN, red lights illuminated: MSL DRAIN VLV, 2B21-F016, at panel 2H11-P602 MSL DRAIN VLV, 2B21-F019, at panel 2H11-P601	
12.	Open the following valve: 2B21-F020 (31EO-EOP-111-2 step 3.1.12)	The following valve is OPEN, red lights illuminated: DRAIN VLV, 2B21-F020, at panel 2H11-P602	

NOTE: Any valid indication of Reactor Pressure and Steam Line Pressure can be used for Step 13.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
13.	Verify differential pressure across MSIVs is less than 200 psid. (31EO-EOP-111-2 step 3.1.13)	Operator has determined differential pressure is less than 200 psid using: REACTOR PRESSURE indicator A(B,C) 2C32-R605A(B,C) on panel 2H11-P603 AND MAIN STEAM PRESS "A"("B") 2N32-R654A(B) indicator on Turbine EHC Panel or recorder PRESS TO STOP VLVS 1 & 4 2N11-R601 OR ***Monitor*** → ***steam pressure*** 2N32-K4001A OR 2N32-K4001B.	

NOTE: It is acceptable if the operator uses the Open Fast Test switch position.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**14.	Open Inboard MSIVs. (31EO-EOP-111-2 step 3.1.13)	At panel 2H11-P602, the following switches are in OPEN SLO TEST, red light illuminated: MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

PROMPT: **WHEN** the operator addresses the Main Condenser Vacuum System, as the Shift Supervisor, **INFORM** the operator that another operator will place it in service and monitor vacuum.

PROMPT: **IF** the operator addresses system restoration, as the Shift Supervisor, **INFORM** the operator that restoration is not required at this time.

ALTERNATE PATH STARTS HERE
(Step 15)

NOTE: The following steps (15 through 25) apply if the candidate recognizes an entry condition to 34AB-T22-001-2, Pipe Break in the Reactor Building, otherwise, go to JPM step 26.

15.	Operator diagnoses steam leak.	At panel 2H11-P601, the Operator acknowledges the following indications: LEAK DET DIFF TEMP HIGH, 601-321 LEAK DET AMBIENT TEMP HIGH, 601-327	
16.	Operator determines which area is producing the alarm. (601-321 step 5.1) or (601-327 step 5.1)	At panel 2H11-P614, the Operator determines the area of the leak by looking at recorder 2G31-R608. The steam tunnel is the area.	
17.	Operator enters the abnormal procedure for Primary Coolant System Pipe Break Reactor Building. (34AB-T22-001-2 step 1.3)	Operator OBTAINS 34AB-T22-001-2, “Primary Coolant System Pipe Break Reactor Building”	
18.	Operator confirms automatic actions. (34AB-T22-001-2 step 4.1)	At panel 2H11-P602, the operator OBSERVES the following INBD valve, red lights illuminated: (Did NOT Close) MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
19.	Operator confirms automatic actions. (34AB-T22-001-2 step 4.1)	At panel 2H11-P602, the operator OBSERVES the following INBD valve, red light illuminated: (Did NOT Close) MSL DRAIN VLV, 2B21-F016.	

NOTE: The **CRITICAL STEPS** will be met by completing JPM steps 20 or 24 and 21 or 25 WITHIN 3 MINUTES of alarms GROUP 1 SYSTEM A & B TRIP (603-208 & 603-209) being received. At a MINIMUM, one valve in each Group 1 line must be isolated to stop the leak.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**20.	IF possible, isolate the leak. (34AB-T22-001-2 step 4.3)	At panel 2H11-P602, the operator PLACES the following INBD Switches to CLOSE, green lights illuminated: MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D.	
**21.	IF possible, isolate the leak. (34AB-T22-001-2 step 4.3)	At panel 2H11-P602, the operator PLACES the following INBD Switch to CLOSE, green lights illuminated: MSL DRAIN VLV, 2B21-F016.	
22.	Operator confirms automatic actions. (34AB-T22-001-2 step 4.1)	At panel 2H11-P601, the operator OBSERVES the following OTBD valves, red lights illuminated: (Did NOT Close) MSIV 2B21-F028A MSIV 2B21-F028B MSIV 2B21-F028C MSIV 2B21-F028D.	
23.	Operator confirms automatic actions. (34AB-T22-001-2 step 4.1)	At panel 2H11-P601, the operator OBSERVES the following INBD valve, red light illuminated: (Did NOT Close) MSL DRAIN VLV, 2B21-F019	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**24.	IF possible, isolate the leak. (34AB-T22-001-2 step 4.3)	At panel 2H11-P601, the operator PLACES the following OTBD Switches to CLOSE, green lights illuminated: MSIV 2B21-F028A MSIV 2B21-F028B MSIV 2B21-F028C MSIV 2B21-F028D.	
**25.	IF possible, isolate the leak. (34AB-T22-001-2 step 4.3)	At panel 2H11-P601, the operator PLACES the following INBD Switch to CLOSE, green light illuminated: MSL DRAIN VLV, 2B21-F019.	

NOTE: The following JPM steps (26 through 34) apply if the candidate enters 603-223, STEAM TUNNEL TEMPERATURE A HIGH or 603-224, STEAM TUNNEL TEMPERATURE B HIGH.

26.	Operator diagnoses steam leak.	At panel 2H11-P603, the Operator acknowledges the following indications: STEAM TUNNEL TEMPERATURE A HIGH, 603-223 STEAM TUNNEL TEMPERATURE B HIGH, 603-224	

NOTE: The **CRITICAL STEPS** will be met by completing steps 29 or 33 and 30 or 34 WITHIN 3 MINUTES of alarms GROUP 1 SYSTEM A & B TRIP (603-208 & 603-209) being received. At a MINIMUM, one valve in each Group 1 line must be isolated to stop the leak.

27.	Operator confirms automatic actions. (603-223 step 5.1) or (603-208 step 5.3)	At panel 2H11-P602, the operator OBSERVES the following INBD valve, red lights illuminated: (Did NOT Close) MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D.	

(** **Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
28.	Operator confirms automatic actions. (603-223 step 5.1) or (603-208 step 5.3)	At panel 2H11-P602, the operator OBSERVES the following INBD valve, red light illuminated: (Did NOT Close) MSL DRAIN VLV, 2B21-F016.	
**29.	Operator confirms automatic actions. (603-223 step 5.1) or (603-208 step 5.3)	At panel 2H11-P602, the operator PLACES the following INBD Switches to CLOSE, green lights illuminated: MSIV 2B21-F022A MSIV 2B21-F022B MSIV 2B21-F022C MSIV 2B21-F022D.	
**30.	Operator confirms automatic actions. (603-223 step 5.1) or (603-208 step 5.3)	At panel 2H11-P602, the operator PLACES the following INBD Switch to CLOSE, green lights illuminated: MSL DRAIN VLV, 2B21-F016.	
31.	Operator confirms automatic actions. (603-224 step 5.1) or (603-209 step 5.3)	At panel 2H11-P601, the operator OBSERVES the following INBD valve, red lights illuminated: (Did NOT Close) MSIV 2B21-F028A MSIV 2B21-F028B MSIV 2B21-F028C MSIV 2B21-F028D.	
32.	Operator confirms automatic actions. (603-224 step 5.1) or (603-209 step 5.3)	At panel 2H11-P601, the operator OBSERVES the following INBD valve, red light illuminated: (Did NOT Close) MSL DRAIN VLV, 2B21-F019.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**33.	Operator confirms automatic actions. (603-224 step 5.1) or (603-209 step 5.3)	At panel 2H11-P601, the operator PLACES the following OTBD Switches to CLOSE, green lights illuminated: MSIV 2B21-F028A MSIV 2B21-F028B MSIV 2B21-F028C MSIV 2B21-F028D.	
**34.	Operator confirms automatic actions. (603-224 step 5.1) or (603-209 step 5.3)	At panel 2H11-P601, the operator PLACES the following INBD Switch to CLOSE, green lights illuminated: MSL DRAIN VLV, 2B21-F019.	

END TIME:__________

NOTE: The terminating cue shall be given to the operator when any one of the following is met:

- After JPM step #25 or 34 is complete.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

EVALUATOR – **PICK UP** the Initiating Cue sheet.

Summary of JPM Attributes

JPM CR-SIM 4 2019-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	8

Step 4 Reset Group I Isolation	The Group I Isolation is required to be reset to re-open the MSIVs.
Step 7 Open the Outboard MSIVs	Opening the Outboard MSIVs is required to re-establish the Main Condenser as the heat sink, and to reduce differential pressure across the Inboard MSIVs less than 200 psid.
Step 11 Open 2B21-F016 & F019	The MSL Drain valves are opened to reduce differential pressure across the Inboard MSIVs less than 200 psid.
Step 14 Open the Inboard MSIVs	Opening the Inboard MSIVs is required to re-establish the Main Condenser as the heat sink.
Step 20 (29) Close the Inboard MSIVs	Isolates the main steam lines.
Step 21 (30) Close 2B21-F016	Isolates the main steam line drains.
Step 24 (33) Close the Outboard MSIVs	Isolates the main steam lines.
Step 25 (34) Close 2B21-F019	Isolates the main steam line drains.

Number of JPM Steps	<30	34
Time to Perform JPM	<45 min	15 min

Normal / Faulted / Alternate Path

Alternate

Once the MSIVs are open IAW 31EO-EOP-111-2, a steam line break ocurrs in the steam tunnel requiring the MSIVs and the main steam drain lines to be isolated within 3 minutes of the Group 1 Trip A & B alarms being received.

Setting (administered)

Simulator

Is LOD “1” or “5”	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. The Condenser Low Vacuum and Low RWL isolations have been bypassed.
2. Main Condenser is in operation with Circ Water and Condensate Systems in operation.
3. An ATWS condition exists and 31EO-EOP-011-2 (RCA) is in progress.
4. EHC is in operation.

INITIATING CUES:

Open the MSIVs to re-establish Main Condenser as the heat sink using 31EO-EOP-111-2.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR-SIM 5 ALL

Title **INITIATE EMERGENCY TORUS VENTING USING THE CAD VALVES (ALTERNATE PATH)**		Version: 1.0
Author: **Anthony Ball**	**Media Number:** 2019-301 CR-SIM 5	**Time** 12.0 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date** **5/17/19**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	CR-SIM 5 2019-301

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Initial development for ILT-12 NRC Exam.	ARB	ABG

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	**INITIATE EMERGENCY TORUS VENTING USING THE CAD VALVES (ALTERNATE PATH)**
JPM NUMBER:	**2019-301 CR-SIM 5**
TASK STANDARD:	This task shall be successfully completed when all of the JPM Critical Steps corresponding to 31EO-EOP-101-2, Sections 4.1 have been correctly performed to Emergency Vent the Torus and SBGT 2B is in operation.
TASK NUMBER:	013.053
OBJECTIVE NUMBER:	013.053.O

PLANT HATCH JTA IMPORTANCE RATING:

RO 4.14

SRO 4.50

K/A CATALOG NUMBER: 223001A2.07

K/A CATALOG JTA IMPORTANCE RATING:

RO 4.20

SRO 4.30

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 1**	**Unit 2**
	34SO-T46-001-1 (Ver 21.5) 31EO-EOP-101-1 (Ver 5.1) 31EO-EOP-012-1 (Ver 7.1)	34SO-T46-001-2 (Ver 15.3) 31EO-EOP-101-2 (Ver 5.0) 31EO-EOP-012-2 (Ver 7.1)

REQUIRED MATERIALS:	**Unit 1**	**Unit 2**
	31EO-EOP-101-1 (Version 5.1) Designated jumpers(2) in EOP jumper book Screwdriver or nutdriver	31EO-EOP-101-2 (Version 5.0) Designated jumpers(2) in EOP jumper book Screwdriver or nutdriver

APPROXIMATE COMPLETION TIME: 12.0 Minutes

SIMULATOR SETUP: REFER TO SIMULATOR SETUP SHEET ON THE FOLLOWING PAGE

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to **100% RTP IC** or **SNAP 615** and leave in **FREEZE**.

2. **INSERT** the following **Event Triggers:**

ET #	Description
EGT48-27	Inserts SBGT 2A low flow overrides when F333B is opened (red light); Inserts **EGT48-31**
EGT48-28	Modifies & decreases Containment pressures when F337B is opened (red light) with SBGT 2B in service.

3. **INSERT** the following **OVERRIDES:**

Activator	TAG #	S/M/L	DESCRIPTION	Final Value	Ramp Rate	Delay
ST-0	aoB21-R623AP2	M	Post-Accident Mon Sys A – Rx Press	15	100	
ST-0	aoB21-R623BP2	M	Post-Accident Mon Sys B – Rx Press	15	100	
ST-0	aoT48-R601AP1	M	DW Press (Wide Range)	41	100	
ST-0	aoT48-R601BP1	M	DW Press (Wide Range)	41	100	
ST-0	aoT48-R607AP2	M	DW Press (Normal)	5	100	
ST-0	aoT48-R607BP2	M	DW Press (Normal)	5	100	
ST-0	aoT48-R608P1	M	DW Press Abnormal	48	100	
ST-0	aoT48-R608P2	M	Torus Press Abnormal	46	100	
ST-0	aoT48-R609P1	M	DW Press Abnormal	41	100	
ST-0	aoT48-R609P2	M	Torus Press Abnormal	39	100	
ST-0	aoT48-R631A	M	DW Press	41	100	
ST-0	aoT48-R631B	M	DW Press	41	100	
ST-0	aoT48-R632A	M	Torus Press	39	100	
ST-0	aoT48-R632B	M	Torus Press	39	100	

3. **INSERT** the following **REMOTE FUNCTIONS:**

REM #	DESCRIPTION	STATUS
rfT48_278	T48- F307, F308, F309, F324, F318, F319, F320, & F326	ORIDE

4. **INSERT** the following **Malfunctions:**

Activator	MALF #	TITLE	FINAL VALUE	RAMP RATE	DELAY
ST-0	mfB21_123A	MSL A Break (before restrictor)	0.15	1000	0000
ST-0	svoT48140	SP Level Water Level In Torus	168	1000	0000

5. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS:**

   A. Perform RC-1, 2, & 3
   B. Start SBGT System “2B” with suction from the Reactor Building.
   C. Allow the Simulator to run until the plant is in the UNSAFE Region of the DSIL Curve.
   D. When in the UNSAFE Region of the DSIL Curve, close the MSIVs and open the ADS valves.
   E. Maintain RWL around “0” inches with Condensate.
   F. TURN OFF THE SPDS SCREENS.
   G. Acknowledge/Reset annunciators.

6. **RUN SCENARIO FILE** and **EVENT TRIGGER** (current rev) **2019-301-615**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 2 Torus pressure is above the Pressure Suppression Pressure.
2. 31EO-EOP-012-2 (PC) is in progress.
3. Standby Gas Treatment 2A is in operation, taking suction from the Reactor Building.
4. Normal AC Power has just been restored.
5. Torus Venting with CAD is desired and Torus pressure is 38 psig and rising slowly.
6. CAD Loop A is unavailable and can NOT be used.
7. SPDS is out of service.

INITIATING CUES:

Reduce Primary Containment pressure by performing Torus venting with CAD Loop B using 31EO-EOP-101-2, Emergency Containment Venting, Step 4.1.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences. (AG-TRN-01-0685 Section 6.5.3 provides examples)

START TIME:__________

1.	Operator identifies the materials that are required.	Operator identifies the required materials and where to obtain them.	
****2.**	Defeat the High Drywell Pressure Isolation signal. (step 4.1.3.a)	At panel 2H11-P654, the operator PLACES the keylock PCIS Override Switches to OVERRIDE for: High Drywell Press, 2T48-F332B High Drywell Press, 2T48-F333B	
****3.**	Defeat the Low RPV Level Isolation signal. (step 4.1.3.a)	At panel 2H11-P654, the operator PLACES the keylock PCIS Override Switches to OVERRIDE for: Low RPV Level, 2T48-F332B Low RPV Level, 2T48-F333B	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**4.	Defeat the Reactor Building High Radiation Isolation signal. (step 4.1.3.a)	At panel 2H11-P654, the operator PLACES the keylock PCIS Override Switches to OVERRIDE for: Rx Bldg High Radn, 2T48-F332B Rx Bldg High Radn, 2T48-F333B	
**5.	Defeat the Refuel Floor High Radiation Isolation signal. (step 4.1.3.a)	At panel 2H11-P654, the operator PLACES the keylock PCIS Override Switches to OVERRIDE for: Refuel Flr High Radn, 2T48-F332B Refuel Flr High Radn, 2T48-F333B	
**6.	Open Torus 2” Vent valve, 2T48-F332B. (step 4.1.3.b)	At panel 2H11-P654: TORUS VENT ISOL VLV, 2T48-F332B is OPEN, red light illuminated.	
**7.	Open Torus 2” Vent valve, 2T48-F333B. (step 4.1.3.b)	At panel 2H11-P654: TORUS VENT ISOL VLV, 2T48-F333B is OPEN, red light illuminated.	

ALTERNATE PATH STARTS HERE

8.	The Operator recognizes and acknowledges the SBGT annunciator	Operator IDENTIFIES 2A SBGT FAN FLOW LOW (657-037) is alarming and transitions to ARP.	
9.	Check low flow condition on 2T41-R618P5, SBGT A Flow to Main Stack. (ARP step 5.1)	At panel 2H11-P657, the operator checks flow indication on 2T41-R618, SBGT A Flow to Main Stack and determines flow is approximately 1000 scfm.	
10.	IF SBGT System is required by plant conditions, check RUNNING, OR START 2T46-D001B, SBGT B Fan/Filter. (ARP step 5.2)	At panel 2H11-P654, the operator determines SBGT B is NOT running and is required to be in service.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**11.	Open 2T46-F003B AND/OR 2T46-F001B. 34SO-T46-001-2, Placard (step 1.0)	At panel 2H11-P654: SBGT B Filter Inlet From Refuel Flr 2T46-F003B is OPEN, red light illuminated AND/OR SBGT B Filter Inlet From Rx Bldg, 2T46-F001B is OPEN, red light illuminated.	
**12.	Place SBGT B in RUN position. 34SO-T46-001-2, Placard (step 2.0)	At panel 2H11-P654, the operator PLACES 2T46-D001B, SBGT B FAN/FILTER to ON, red light illuminated.	
13.	Confirm 2T46-F002B OPENS. 34SO-T46-001-2, Placard (step 3.0)	At panel 2H11-P654, the operator CONFIRMS that 2T46-F002B, FLTR DISCH OPENS, red light illuminated	
14.	Confirm SBGT B HTR Red Light ILLUMINATES. 34SO-T46-001-2, Placard (step 4.0)	At panel 2H11-P654, the operator CONFIRMS that SBGT B HTR ON, red Light illuminated.	
15.	Confirm SBGT B Flow increases to 1500-4000 SCFM. 34SO-T46-001-2, Placard (step 5.0)	At panel 2H11-P654, the operator CONFIRMS 2U41-R600, SBGT B Flow To Main Stack, rises to 1500-4000 SCFM.	
16.	Confirm OPEN OR OPEN the following dampers as required by plant conditions: 2T46-F001A, SBGT A Fltr Inlet From Rx Bldg 2T46-F002A, SBGT A Fltr Disch 2T46-F003A, SBGT A Fltr Inlet From Refuel Flr (ARP step 5.4)	At panel 2H11-P657, the operator CONFIRMS the following dampers red light illuminated: 2T46-F001A 2T46-F002A 2T46-F003A	
17.	If 2T46-D001A, SBGT Filter, damper lineup cannot be corrected, SHUTDOWN 2T46-D001A, SBGT A Fan/Filter. (ARP step 5.6)	At panel 2H11-P657, the operator PLACES 2T46-D001A, SBGT A FAN/FILTER to OFF, green light illuminated.	

(** **Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**18.	Using Torus Flow Controller, 2T48-R616B, Open Torus Vent Flow Control Valve, 2T48-F337B. (step 4.1.3.c)	At panel 2H11-P654, the operator Operates 2T48-R616B, Torus Vent Flow Cntl Vlv 2T48-F337B, as required to maintain Suppression Chamber pressure below 56 psig.	
19.	Monitor Torus Pressure indication	At panel 2H11-P657 (P654), Torus pressure is being monitored by the operator and determines Torus pressure is lowering.	

PROMPT: **IF** the operator addresses System Restoration, as the Shift Supervisor, **INFORM** the operator that it is NOT desired at this time.

END TIME:__________

NOTE: The terminating cue shall be given to the operator when:

- After JPM step #19 is complete.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM CR-SIM 5 2019-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	9

Step 2 Defeat DW press	Removes signal to allow F332 & F333B to be open.
Step 3 Defeat RWL low	Removes signal to allow F332 & F333B to be open.
Step 4 Defeat RB Rad high	Removes signal to allow F332 & F333B to be open.
Step 5 Defeat RF Rad high	Removes signal to allow F332 & F333B to be open.
Step 6 Open 2T48-F332B	Aligns Torus vent flow path.
Step 7 Open 2T48-F333B	Aligns Torus vent flow path.
Step 11 Open 2T46-F001/F0033B	Aligns SBGT 2B suction path.
Step 12 SBGT 2B in RUN	Re-establishes SBGT flow.
Step 18 Open 2T48-F337B	Establishes Torus vent flow.

Number of JPM Steps	<30	19
Time to Perform JPM	<45 min	12.0 min

Normal / Faulted / Alternate Path

Alternate

31EO-EOP-101-2, Sections 4.1 have been correctly performed to Emergency Vent the Torus with SBGT 2B now in operation..

Setting (administered)

Simulator

Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 2 Torus pressure is above the Pressure Suppression Pressure.
2. 31EO-EOP-012-2 (PC) is in progress.
3. Standby Gas Treatment 2A is in operation, taking suction from the Reactor Building.
4. Normal AC Power has just been restored.
5. Torus Venting with CAD is desired and Torus pressure is 38 psig and rising slowly.
6. CAD Loop A is unavailable and can NOT be used.
7. SPDS is out of service.

INITIATING CUES:

Reduce Primary Containment pressure by performing Torus venting with CAD Loop B using 31EO-EOP-101-2, Emergency Containment Venting, Step 4.1.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR/SIM 6 RO & SRO-I

Title		Version:
ENERGIZE 600 VAC BUS 2D		1.0
Author: Arthur Genereux	**Media Number:** 2019-301 CR-SIM 6	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date:** **5/17/19**

Energy to Serve Your World℠

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 CR-SIM 6

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	**ENERGIZE 600 VAC BUS 2D**
JPM NUMBER:	2019-301 CR-SIM 6
TASK STANDARD:	This task shall be successfully completed when all of the JPM Critical Steps corresponding to 34SO-R23-001-2 have been correctly performed to energize 600VAC Bus 2D from its normal power supply.
TASK NUMBER:	027.049
OBJECTIVE NUMBER:	027.049.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 3.07

SRO 2.83

K/A CATALOG NUMBER: 262001A4.01

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.4

SRO 3.7

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 2**
	34SO-R23-001-2 (Version 10.4)

REQUIRED MATERIALS:	**Unit 2**
	34SO-R23-001-2 (Version 10.4)

APPROXIMATE COMPLETION TIME: 10 Minutes

SIMULATOR SETUP: REFER TO SIMULATOR SETUP SHEET ON THE FOLLOWING PAGE

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to **100% Power** and leave in **FREEZE**.

2. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS:**

   A. De-energize 600 VAC Bus 2D by opening the normal supply breaker, ACB 135684.

3. **INSERT** the following **ORS OVERRIDES: None**

TAG #	P/L	DESCRIPTION	STATUS	ACT. TIME

4. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.

5. **PLACE DANGER TAGS** on the following equipment: **None**

MPL #	COMPONENT	TAGGED POSITION

6. **ESTIMATED** Simulator **SETUP TIME**: **10 Minutes**

EVALUATOR COPY

INSTRUCTOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Due to a maintenance requirement, 600VAC Bus 2D has been de-energized.
2. 4160 VAC Buses "E," "F," and "G" are on their normal power supply.
3. Work has been satisfactorily completed on the transformer.
4. All lockout relays on the transformer have been reset.

INITIATING CUES:

Energize 600VAC Bus 2D from its normal power supply and restore loads to the bus per Step 7.1.6 of 34SO-R23-001-2.

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

1.	Confirm power is available from 4160V Bus 2G as indicated by the potential lights. (34SO-R23-001-2 step 7.1.6.1)	On panel 2H11-P652, operator verifies potential lights are lit.	
2.	Confirm 4160V Bus 2G voltage is normal (34SO-R23-001-2 step 7.1.6.2)	On panel 2H11-P652, operator using the Voltmeter Select Startup AUX XFMR switch selects each winding for SAT 2D verifies approximately 4160 V.	

PROMPT: **IF** the operator addresses 600V Station Service Transformer 2D Auxillary Relay **INFORM** the operator that it is reset (included in initial conditons).

3.	Take ACB 135680, Alt supply, and ACB135684, Normal supply, control switches to TRIP. (34SO-R23-001-2 step 7.1.6.4)	On panel 2H11-P652, operator confirms ACB 135680 and ACB135684 control switches in TRIP. Green lights lit.	

(Indicates critical step)**

**4.	Close ACB 135556, feeder to SST 2D (34SO-R23-001-2 step 7.1.6.5)	On panel 2H11-P652, operator closes ACB 135556. Red light lit.	
**5.	Strip all loads of 600VAC Bus 2D by tripping all feeder breakers. (34SO-R23-001-2 step 7.1.6.6)	On panel 2H11-P652, operator trips the feeder breakers to: • 2R24-S010, Intake Structure MCC-2B • 2R24-S027, Diesel Bldg MCC-2C • 2R24-S012, 600/208V MCC-2B Ess. Div 2 Green lights lit.	
**6.	Close ACB 135684, Normal supply, And confirm 600VAC Bus 2D voltage is normal. (34SO-R23-001-2 step 7.1.6.7)	On panel 2H11-P652, operator closes ACB 135556, Red light lit. Verifies 600VAC Bus 2D potential lights are lit and each phase volage is 600V using the 600V Bus 2D Volt Select switch.	
**7.	Depress 600VAC 2D Non-Essential Load Lockout reset pushbutton. (34SO-R23-001-2 step 7.1.6.8.1)	On panel 2H11-P652, operator Depress 600VAC 2D Non-Essential Load Lockout reset pushbutton.	
**8.	Close feeder breakers one at a time.	On panel 2H11-P652, operator closes the feeder breakers to: • 2R24-S010 • 2R24-S027 • 2R24-S012 Red lights lit.	

PROMPT: **IF** the operator addresses starting up equipment powered from 600VAC 2D **INFORM** the operator that it is not desired at this time.

END TIME:__________

NOTE: The terminating cue shall be given to the operator when:

- When the operator completes step 8.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: That Completes this JPM.

(Indicates critical step)**

Summary of JPM Attributes

JPM 2019-301 CR-SIM 6:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	5

Step 4 Close ACB 135556	Energizes Station Service Transformer 2D.
Step 5 Strip loads	Disconnects distribution panels from bus.
Step 6 Close ACB 135684	Energizes 600VAC Bus 2D.
Step 7 Depress Non-Essent Load Lockout PB	Vital AC and SS Battery chargers returned to service
Step 8 Close feeder breakers	Supplies power 600VAC distribution panels

Number of JPM Steps	<30	10
Time to Perform JPM	<10 min	10 min

Normal / Faulted / Alternate Path

Alternate Path NO

Setting (administered)

Simulator

Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Due to a maintenance requirement, 600VAC Bus 2D has been de-energized.
2. 4160 VAC Buses "E," "F," and "G" are on their alternate power supply.
3. Work has been satisfactorily completed on the transformer.
4. All lockout relays on the transformer have been reset.

INITIATING CUES:

Energize 600VAC Bus 2D from its normal power supply and restore loads to the bus per Step 7.1.6 of 34SO-R23-001-2.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR-SIM 7 RO & SRO-I

Title		Version
Override and Open Plant Service Water Isolation Valves (Alt Path for Break in Turbine Building)		1.0
Author	**Media Number**	**Time**
Anthony Ball	2019-301 CR-SIM 7	5 Minutes
Line Review By (N/A for minor revisions)		**Date**
N/A		N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions)		**Date**
N/A		N/A
Approved By (Training Program Manager or Lead Instructor)		**Date**
Charlie Edmund		5/17/2019

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 CR-SIM 7

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/17/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 () **UNIT 2** (X)

TASK TITLE:	**Override and Open Plant Service Water Isolation Valves (Alt Path for Break in Turbine Building)**
JPM NUMBER:	2019-301 CR-SIM 7
TASK STANDARD:	The task shall be completed when the PSW Isolation valves isolation signal has been overridden and 2P41-F316A, B, C, & D are opened and then subsequently closed due to a Turbine Building PSW Header leak.
TASK NUMBER:	200.013
OBJECTIVE NUMBER:	200.013.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 4.0

SRO 4.0

K/A CATALOG NUMBER 295018AA2.05

K/A CATALOG JTA IMPORTANCE RATING:

RO 2.9

SRO 2.9

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 1**	**Unit 2**
	N/A	34AB-P41-001-2, Ver. 13.7

REQUIRED MATERIALS:	**Unit 1**	**Unit 2**
	N/A	34AB-P41-001-2, Ver. 13.7

VALIDATION TIME: 5 Minutes

SIMULATOR SETUP: Refer to Simulator Setup on the following page.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to **IC #113**, or **SNAP 617**, and leave in **FREEZE**.
2. **INSERT** the following **MALFUNCTION & TRIGGERS:**

Activator	MALF #	TITLE	FINAL VALUE	RAMP RATE	DELAY
ST-0	mfG31_242	RWCU Non-isolable Leak (0-10000 gpm)	2	1000	00000
EGP41-5	mfP41_264A	Plant Service Water Line Break;	65	100	9999

Trigger #	DESCRIPTION	CONDITIONS
EGP41-5	Inserts PSW leak and Event Triggers **EGP41-6, EGP41-7, EGP41-8 & EGP41-9**	TB F316s Open
EGP41-6	Deletes mfP41_264A (leak) when 2P41-F316A & B are closed.	
EGP41-7	Deletes mfP41_264A (leak) when 2P41-F316B & C are closed.	
EGP41-8	Deletes mfP41_264A (leak) when 2P41-F316A & D are closed.	
EGP41-9	Deletes mfP41_264A (leak) when 2P41-F316D & C are closed.	

3. Take the simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS.**
   A. When the reactor scrams on high Drywell Pressure, perform RC-1 and RC-2
   B. Stabilize RWL at 10 to 50 inches
   C. **ALLOW** 2P41-F316A-D, PSW Isolation valves, to CLOSE
   D. **START** PSW Pump 2D
4. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.
5. **ESTIMATED** Simulator **SETUP TIME**: 25 minutes

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An event has occurred that caused the Unit 2 Turbine Building Plant Service Water Isolation valves to isolate.
2. There was NO indication of a PSW line break when the isolation occurred.
3. Another operator is handling the plant and other alarms NOT related to your task.

INITIATING CUES:

IAW 34AB-P41-001-2, re-open the Turbine Building Plant Service Water Isolation Valves.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

NOTE: This JPM is written assuming the operator uses the PLACARD posted at 2H11-P652 to re-open the Turbine Bldg. Isolation valves.

1.	Operator obtains the procedure.	Operator obtains a copy of 34AB-P41-001-2.	

NOTE: IAW 34AB-P41-001-2, Steps 4.20.1.1 and 4.20.1.2 may be performed concurrently to allow both divisions to be re-pressurized at the same time.

2.	Operator verifies PSW Division I Header Pressure is greater than 80 psig. Step 4.20.1.1	Operator VERIFIES Division I PSW Header Pressure as indicated by 2P41-R601A on 2H11-P652 is greater than 80 psig.	

NOTE: Override switches are arranged A/D and B/C so both switches must be in OVERRIDE to open Division I or Division II valves.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**3.	Place the keylock switch for 2P41-F316A & 2P41-F316D to OVERRIDE. Step 4.20.1.1.1 Step 4.20.1.2.1	At panel 2H11-P652, the operator POSITIONS the keylock switch for valve 2P41-F316A & D to OVERRIDE.	
**4.	Place the keylock switch for 2P41-F316B & 2P41-F316C to OVERRIDE. Step 4.20.1.1.1	At panel 2H11-P652, the operator POSITIONS the keylock switch for valve 2P41-F316B & C to OVERRIDE.	

NOTE: The operator may elect to open the 2P41-F316C (D) valve before the 2P41-F316A (B) valve.

**5.	OPEN 2P41-F316A OR 2P41-F316C. Step 4.20.1.1.2	At panel 2H11-P652, the operator POSITIONS the control switch for 2P41-F316A or C to OPEN.	
**6.	THROTTLE open 2P41-F316C OR 2P41-F316A maintaining Division I header pressure > 80 psig. Step 4.20.1.1.3	At panel 2H11-P652, the operator THROTTLES open 2P41-F316C or A, while maintaining Division I Header Pressure > 80 psig.	

NOTE: IF 2P41-F316 C (A) switch is placed to CLOSE, the valve will travel to the full closed position.

7.	Operator verifies PSW Division II Header Pressure is greater than 80 psig. Step 4.20.1.2	Operator VERIFIES Division II PSW Header Pressure as indicated by 2P41-R601B on 2H11-P652 is greater than 80 psig.	

NOTE: The operator may elect to open the 2P41-F316D valve before the 2P41-F316B valve.

**8.	OPEN 2P41-F316B OR 2P41-F316D. Step 4.20.1.2.2	At panel 2H11-P652, the operator POSITIONS the control switch for 2P41-F316B or D to OPEN.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**9.	THROTTLE open 2P41-F316D OR 2P41-F316B maintaining Division II header pressure > 80 psig. Step 4.20.1.2.3	At panel 2H11-P652, the operator THROTTLES open 2P41-F316D or B, while maintaining Division II Header Pressure > 80 psig.	

ALTERNATE PATH STARTS HERE

EGP41-5 will **INSERT** malfunction mfP41_264A, PSW Division 1 break when the RED lights are ON for 2P41-F316A thru D.

10.	The Operator recognizes and acknowledges the Turbine Bldg. PSW annunciator	Operator IDENTIFIES TURB BLDG PSW FLOW HIGH, (650-215) is alarming and transitions to ARP.	
11.	Check the following: 2P41-R601A, Div. I PSW pressure indicator. (ARP step 5.1.1)	At panel 2H11-P650, the operator checks 2P41-R601A, Div. I PSW pressure indicator and determines a lowering pressure.	
12.	Check the following: 2P41-R601B, Div. II PSW pressure indicator. (ARP step 5.1.2)	At panel 2H11-P650, the operator checks 2P41-R601B, Div. II PSW pressure indicator and determines a lowering pressure.	
13.	Check the following: PSW pump status. (ARP step 5.1.3)	At panel 2H11-P650, the operator checks PSW pump status and determines ALL PSW Pumps are running, red light illuminated.	
14.	If there is indication of a system leak, enter 34AB-P41-001-2, Loss of Plant Service Water. (ARP step 5.2)	The operator DETERMINES there is indication of a PSW leak and enters 34AB-P41-001-2, Loss of Plant Service Water.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: 34AB-P41-001-2, step 4.2 contains the following "**IF**" "**THEN**" Table for operator actions.

IF	**EITHER**	**THEN**
	1. A total loss of PSW exists OR	1. Enter 34AB-C71-001-2, Scram Procedure, AND SCRAM the reactor AND
	2. Turb. Bldg. PSW Inlet pressure on 2P41-R607 is less than 30 PSIG OR	2. Confirm CLOSED/CLOSE 2P41-F316A, 2P41-F316B, 2P41-F316C, 2P41-F316D, Valves. AND
	3. There is an indication of a major pipe break in the Turbine Building. OR	3. If either PSW division header pressure remains below 50 PSIG, TRIP and PULL TO LOCK the PSW Pumps in that division. (associated green lights will go out) AND
	4. Either PSW division header pressure is less than 50 PSIG	4. Go to section 4.20 AND re-evaluate whether it is permissible to re-open the opposite division isolation valves to establish flow to the Turb. Bldg.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
15.	**IF: EITHER** A total loss of PSW exists **********************. 34AB-P41-001-2 (Step 4.2)	At panel 2H11-P650, the operator DETERMINES a total loss of PSW does NOT exist.	
16.	**IF: EITHER** **********************. 2. Turb. Bldg. PSW Inlet pressure on 2P41-R607 is less than 30 PSIG 34AB-P41-001-2 (Step 4.2)	At panel 2H11-P656, the operator DETERMINES Turb. Bldg. PSW Inlet pressure on 2P41- R607 IS less than 30 PSIG.	
17.	**IF: EITHER** **********************. 3. There is an indication of a major pipe break in the Turbine Building. 34AB-P41-001-2 (Step 4.2)	The operator DETERMINES there IS indication of a major pipe break in the Turbine Building.	
18.	**IF: EITHER** **********************. 4. Either PSW division header pressure is less than 50 PSIG. 34AB-P41-001-2 (Step 4.2)	At panel 2H11-P650, the operator DETERMINES Division 1 & Division 2 header pressure IS less than 50 psig.	

NOTE: The operator may address entering 34AB-C71-001-2, Scram Procedure.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: IF 2P41-F316 A-D switches are placed to CLOSE, the valves will travel to the full closed position.

****19.**	Confirm CLOSED/CLOSE 2P41-F316A AND/OR 2P41-F316C, Valves. 34AB-P41-001-2 (Step 4.2.2)	At panel 2H11-P652, the operator CLOSES 2P41-F316A, AND/OR 2P41-F316C, red lights extinguished.	
****20.**	Confirm CLOSED/CLOSE 2P41-F316B AND/OR 2P41-F316D, Valves. 34AB-P41-001-2 (Step 4.2.2)	At panel 2H11-P652, the operator CLOSES 2P41-F316B, AND/OR 2P41-F316D, red lights extinguished.	
21.	Checks the following: 2P41-R601A, Div. I PSW pressure indicator. 34AB-P41-001-2 (Step 4.2.3)	At panel 2H11-P650, the operator checks 2P41-R601A, Div. I PSW pressure indicator and determines a rising pressure.	
22.	Check the following: 2P41-R601B, Div. II PSW pressure indicator. 34AB-P41-001-2 (Step 4.2.3)	At panel 2H11-P650, the operator checks 2P41-R601B, Div. II PSW pressure indicator and determines a rising pressure.	

NOTE: At this time the operator may notify the SRO that a PSW line break exists in the Turbine Building and the PSW Turbine Building Isolation Valves, 2P41-F316A-D cannot be overridden and opened.

END TIME:__________

NOTE: The terminating cue shall be given to the operator when:

– Operator completes step 22 of this JPM.

– With NO reasonable progress, the operator exceeds double the allotted time.

– Operator states the task is complete.

TERMINATING CUE: We will stop here.

(** **Indicates critical step)**

Summary of JPM Attributes

JPM 2019-301 CR-SIM 7:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	8

Step 3	Overrides Signal	Allows 2P41-F316A & D to be opened.
Step 4	Overrides Signal	Allows 2P41-F316B & C to be opened.
Step 5	Opens fully 2P41-F316A or C	Aligns a Division I flow path.
Step 6	Throttles 2P41-F316C or A	Aligns a Division I flow path.
Step 8	Opens fully 2P41-F316B or D	Aligns a Division II flow path.
Step 9	Throttles 2P41-F316D or B	Aligns a Division II flow path.
Step 19	Closes 2P41-F316A OR C	Isolates Division I flow path to Turbine Building.
Step 20	Closes 2P41-F316B OR D	Isolates Division II flow path to Turbine Building.

Number of JPM Steps	<30	22
Time to Perform JPM	<45 min	5 min

Normal / Faulted / Alternate Path

Alternate Path — IAW 34AB-P41-001-2, override and re-open the Turbine Bldg. PSW isolation valves then close valves when leak is discovered.

Setting (administered)

Simulator

Is LOD “1” or “5”	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An event has occurred that caused the Unit 2 Turbine Building Plant Service Water Isolation valves to isolate.
2. There was NO indication of a PSW line break when the isolation occurred.
3. Another operator is handling the plant and other alarms NOT related to your task.

INITIATING CUES:

IAW 34AB-P41-001-2, re-open the Turbine Building Plant Service Water Isolation Valves.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
CR-SIM 8 RO ONLY

Title **REMOVE RF VENT FILTER 2T41-D007 FROM SERVICE**		**Version:** 1.0
Author: Anthony Ball	**Media Number:** 2019-301 CR-SIM 8	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date:** **05/15/2019**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 CR-SIM 8

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	**REMOVE RF VENT FILTER 2T41-D007 FROM SERVICE**
JPM NUMBER:	**2019-301 CR-SIM 8**
TASK STANDARD:	The task shall be completed when the operator has removed RF Vent Filter 2T41-D007 from service IAW 34SO-T41-006-2, Refueling Floor Ventilation System.
TASK NUMBER:	037.035
OBJECTIVE NUMBER:	037.035.O

K/A CATALOG NUMBER: 288000A4.01

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.10

SRO 2.90

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	Unit 1	Unit 2
	N/A	34SO-T41-006-2, Ver. 12.4

REQUIRED MATERIALS:	Unit 1	Unit 2
	N/A	34SO-T41-006-2, Ver. 12.4

VALIDATION TIME: 15 Minutes

SIMULATOR SETUP: Refer to Simulator Setup on the following page.

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** Simulator to **IC# 113 (100% RTP)** or **SNAP 618** and leave in **FREEZE**.

2. **INSERT** the following **MALFUNCTIONS:**

Key #	MALF #	TITLE	FINAL VALUE	RAMP RATE	DELAY
NONE					

3. **ACTIVATE** the following **EVENT TRIGGERS:**

Trigger #	DESCRIPTION	CONDITIONS	Expert Command
NONE			

4. **INSERT** the following **ORS OVERRIDES:**

Activator	TAG #	S/M/L	DESCRIPTION	Final Value	Ramp Rate	Delay
RB-1	aoT41-R618P3	M	R/F Supply Air Flow	14.5	1000	9999
RB-1	aoT41-R618P4	M	R/F Supply Air Flow	15.0	1000	9999

5. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS:**

6. **ENSURE** the following line up on 2H11-P654:
   - Control switches for **2T41-C002A & C005A are in RUN**
   - Control switches for **2T41-C002B & C005B are in STBY**

7. **PLACE** the Simulator in **FREEZE** until the crew assumes the shift.

8. **ESTIMATED** Simulator **SETUP TIME**: **10 Minutes**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. 2T41-D007, Refueling Floor Vent Filter, is scheduled to be removed from service.
2. The Shift Supervisor has approved 2T41-D007, Refueling Floor Vent Filter, being removed from service.

INITIATING CUES:

IAW 34SO-T41-006-2, Refueling Floor Ventilation System, Section 4.3.3, remove 2T41-D007, Refueling Floor Vent Filter, from service.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

NOTE: Unless otherwise noted, all the following actions will be performed at panel 2H11-P657.

****1.**	PLACE control switch to OFF for: 2T41-C005A, Refuel Flr Vent Exh Fan. (step 4.3.3.1.a)	Operator PLACES the control switch to OFF and observes green light illuminated for fan.	
2.	CONFIRM 2T41-C005B, Refuel Flr Vent Exh Fan, STARTS. (step 4.3.3.1.b)	Operator CONFIRMS 2T41-C005B starts, observes red light illuminated for fan.	
****3.**	PLACE control switch to RUN for 2T41-C005B, Refuel Flr Vent Exh Fan. (step 4.3.3.1.c)	Operator PLACES the control switch to RUN and observes red light illuminated for fan.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
4.	Adjust 2T41-R032 and 2T41-R037, Flow Controller, to obtain ~ 15 KCFM. (step 4.3.3.3)	Operator directs a Systems Operator to adjust 2T41-R032 and 2T41-R037, Flow Controller, to obtain ~ 15 KCFM.	

SIMULATOR OPERATOR: **WHEN** the operator addresses adjusting 2T41-R032 and 2T41-R037, Flow Controller, **DEPRESS RB-1** to adjust flows to approximately 15 SCFM.
ONCE complete, NOTIFY operator that 2T41-R032 and 2T41-R037 have been adjusted. (Step 4.3.3.3)

5.	CONFIRM 2T41-R618, Rx Building Vent Flow Recorder, indicates approximately: Pt. 3 Supply Flow 14.8 KCFM Pt. 4 Exhaust Flow 15.2 KCFM (step 4.3.3.3)	Operator confirms on 2T41-R618 Blue Pen ~14.8 KCFM Purple Pen ~15.2 KCFM	

NOTE: This JPM is written assuming Supply and Vent Flow are within specifications and NO controller adjustments need to be performed.

6.	CONFIRM 2T46-R604A and 2T46-R604B, Sec Cnmt Diff Press A&B, on 2H11-P700, indicates approximately 0.25 inches water negative pressure. (step 4.3.3.4)	Operator confirms on 2T46-R604A and 2T46-R604B approximately 0.25 inches water negative pressure.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**7.	CLOSE 2T41-F041A, Refuel Flr Vent Filter D007 Inlet Damper. (step 4.3.3.5)	Operator PLACES 2T41-F041A control switch to CLOSE and observes green light illuminated for valve.	

END TIME:__________

NOTE: The terminating cue shall be given to the operator when any of the following conditions are met:

- Operator completes step 7 of this JPM.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM 2017-301 CR-SIM 8:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	3

Step 1 Place 2T41-C005A to OFF   Fan must be taken to off to start C005B.

Step 3 Place 2T41-C005B to RUN   Fan must be taken to RUN to keep in service.

Step 7 Place 2T41-F016A to CLOSE   The damper must be closed for filter to be out of service.

Number of JPM Steps	<30	7
Time to Perform JPM	<45 min	15 min

Normal / Faulted / Alternate Path

Normal

Setting (administered)

SIMULATOR

Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. 2T41-D007, Refueling Floor Vent Filter, is scheduled to be removed from service.
2. The Shift Supervisor has approved 2T41-D007, Refueling Floor Vent Filter, being removed from service.

INITIATING CUES:

IAW 34SO-T41-006-2, Refueling Floor Ventilation System, Section 4.3.3, remove 2T41-D007, Refueling Floor Vent Filter, from service.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
PLANT 1 ALL

Title **VENT THE SCRAM AIR HEADER**		Version: 1.0
Author: Arthur Genereux	**Media Number:** 2019-301 PLANT 1	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date:** **5/17/2019**

Course Number	Program Name	Media Number
	OPERATIONS TRAINING	2019-301 PLANT 1

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

NIT 1 (X) UNIT 2 (X)

TASK TITLE:	**Perform a Manual Startup of THE CORE SPRAY SYSTEM (ALTERNATE PATH)**
JPM NUMBER:	**2019-301 PLANT 1**
TASK STANDARD:	The task shall be completed when the operator has successfully vented the scram air header per 31EO-EOP-103.
TASK NUMBER:	010.015
OBJECTIVE NUMBER:	010.015.O

PLANT HATCH JTA IMPORTANCE RATING:

RO 4.50

SRO 3.65

K/A CATALOG NUMBER: 295037EA1.05

K/A CATALOG JTA IMPORTANCE RATING:

RO 4.10

SRO 4.10

OPERATOR APPLICABILITY: Systems Operator (SO)

NOTE:

IT IS INTENDED FOR THIS TO BE PERFORMED ON **UNIT 1**.
UNIT 2 IS INCLUDED IN CASE WORK IN THE AREA PREVENTS PERFORMANCE ON UNIT 1.

GENERAL REFERENCES:	**Unit 1**	**Unit 2**
	31EO-EOP-103-1 (Version 6.4)	31EO-EOP-103-2 (Version 6.4)

REQUIRED MATERIALS:	**Unit 1**	**Unit 2**
	31EO-EOP-103-1 (Version 6.4) Adjustable Wrench	31EO-EOP-103-2 (Version 6.4) Adjustable Wrench

APPROXIMATE COMPLETION TIME: 10 Minutes

SIMULATOR SETUP: N/A

EVALUATOR COPY

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A Reactor scram signal has been received and all the control rods did NOT insert to Position 02 and Reactor power is greater than 10%.
2. The blue scram inlet and outlet valve lights are extinguished.
3. 31EO-EOP-011-1 (RCA) is in progress.

INITIATING CUES:

Vent the scram air header per 31EO-EOP-103-1.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:_________

1.	Operator identifies the materials that are required. (pliers)	Operator identifies the required materials and where to obtain.	

NOTE: WHEN the Operator closes 1C11-F095 valve, the handwheel will be turned in the clockwise direction until it will NOT turn any farther.

****2.**	CLOSE 1C11-F095 (31EO-EOP-103-1 step 3.6.1)	At location 130RAR03, 1C11-F095, SCRAM AIR HEADER ISOLATION VALVE is CLOSED.	

****3.**	Remove cap if installed from end of piping downstream of 1C11-R013-TV1 (31EO-EOP-103-1 step 3.6.2)	At location 130RAR03, cap is REMOVED from end of piping downstream of 1C11-R013-TV1.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
4.	Confirm OPEN/OPEN 1C11-R013-IV1 (31EO-EOP-103-1 step 3.6.3)	At location 130RAR03, 1C11-R013-IV1, PRESSURE INSTRUMENTATION ISOLATION VALVE is OPEN.	
****5.**	OPEN 1C11-R013-TV1 (31EO-EOP-103-1 step 3.6.4).	At location 130RAR03, 1C11-R013-TV1, PRESSURE INSTRUMENTATION VENT VALVE, is OPEN, Scram Air Header pressure decreasing on 1C11-PI-R013.	

PROMPT: **IF** the operator addresses Scram Air Header Pressure, **INDICATE** that the Scram Air Header Pressure is decreasing and that you can hear the air escaping.

END TIME:_________

NOTE: The terminating cue shall be given to the operator when:

- After JPM step #5 is complete.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM 2019-301 Plant 1:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	3
Step 2 Close 1C11-F095	Isolates air to the Scram Air Header	
Step 3 Remove cap	Aligns Scram Air Header Vent Path.	
Step 5 Open 1C11-R013-TV1	Vents Scram Air Header.	
Number of JPM Steps	<30	5
Time to Perform JPM	<45 min	10 min
Normal / Faulted / Alternate Path		
Normal Path		
Setting (administered)		
Simulator		
Is LOD "1" or "5"	NO	NO

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A Reactor scram signal has been received and all the control rods did NOT insert to Position 02 and Reactor power is greater than 10%.
2. The blue scram inlet and outlet valve lights are extinguished.
3. 31EO-EOP-011-1 (RCA) is in progress.

INITIATING CUES:

Vent the scram air header per 31EO-EOP-103-1.

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A Reactor scram signal has been received and all the control rods did NOT insert to Position 02 and Reactor power is greater than 10%.
2. The blue scram inlet and outlet valve lights are extinguished.
3. 31EO-EOP-011-2 (RCA) is in progress.

INITIATING CUES:

Vent the scram air header per 31EO-EOP-103-2.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

1.	Operator identifies the materials that are required. (pliers)	Operator identifies the required materials and where to obtain.	

NOTE: WHEN the Operator closes 2C11-F095 valve, the handwheel will be turned in the clockwise direction until it will NOT turn any farther.

****2.**	CLOSE 2C11-F095 (31EO-EOP-103-2 step 3.6.1).	At location 130RAR22, 2C11-F095, SCRAM AIR HEADER ISOLATION VALVE is CLOSED.	

****3.**	REMOVE cap if installed from end of piping downstream of 2C11-R013-TV1 (31EO-EOP-103-2 step 3.6.2).	At location 130RAR22, cap is REMOVED from end of piping downstream of 2C11-R013-TV1.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
4.	Confirm OPEN 2C11-R013-IV1 (31EO-EOP-103-2 step 3.6.3).	At location 130RAR22, 2C11-R013-IV1, PRESSURE INSTRUMENTATION ISOLATION VALVE is OPEN.	
****5.**	OPEN 2C11-R013-TV1 (31EO-EOP-103-2 step 3.6.4).	At location 130RAR22, 2C11-R013-TV1, PRESSURE INSTRUMENTATION VENT VALVE, is OPEN, Scram Air Header pressure decreasing on 2C11-PI-R013.	

PROMPT: **IF** the operator addresses Scram Air Header Pressure, **INDICATE** that the Scram Air Header Pressure is decreasing and that you can hear the air escaping.

END TIME:__________

NOTE: The terminating cue shall be given to the operator when:

- When the operator completes step 5.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

Summary of JPM Attributes

JPM Plant 1 2019-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	3
Step 2 Close 2C11-F095	Isolates air to the Scram Air Header	
Step 3 Remove cap	Aligns Scram Air Header Vent Path.	
Step 5 Open 2C11-R013-TV1	Vents Scram Air Header.	
Number of JPM Steps	<30	5
Time to Perform JPM	<45 min	10 min
Normal / Faulted / Alternate Path Normal Path		
Setting (administered) Simulator		
Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A Reactor scram signal has been received and all the control rods did NOT insert to Position 02 and Reactor power is greater than 10%.
2. The blue scram inlet and outlet valve lights are extinguished.
3. 31EO-EOP-011-2 (RCA) is in progress.

INITIATING CUES:

Vent the scram air header per 31EO-EOP-103-2.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
PLANT 2 ALL

Title **FROM OUTSIDE THE CONTROL ROOM, ENERGIZE AN EMERGENCY BUS (Alternate path)**		**Version:** 1.0
Author: Arthur Genereux	**Media Number:** 2019-301 PLANT 2	**Time:** 20 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date:** **5/17/2019**

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 Plant 2

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	**Perform a Manual Startup of the Core Spray System (ALTERNATE PATH)**
JPM NUMBER:	2019-301 PLANT 2
TASK STANDARD:	The task shall be completed when the operator has successfully manually caused 1C Diesel Generator voltage of 4,160 VAC to be established and has forced the closure of the 1C Emergency Diesel Generator ouput breaker per 34AB-R43-001.
TASK NUMBER:	028.026
OBJECTIVE NUMBER:	028.026.O

PLANT HATCH JTA IMPORTANCE RATING:

RO 3.64

SRO Not Available

K/A CATALOG NUMBER: 264000A3.04

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.90

SRO 3.40

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO), Systems Operator (SO)

GENERAL REFERENCES:	**Unit 1**
	34AB-R43-001-1 (Version 6.1) 31RS-OPS-002-1 (Version 6.0)

REQUIRED MATERIALS:	**Unit 1**
	34AB-R43-001-1 (Version 6.1)

APPROXIMATE COMPLETION TIME: 20 Minutes

SIMULATOR SETUP: N/A

(Indicates critical step)**

EVALUATOR COPY

UNIT 1

READ TO THE APPLICANT

INITIAL CONDITIONS:

1. The Main Control Room has been evacuated.
2. The 1G 4160VAC Emergency Bus is DE-ENERGIZED.
3. ALL 1G 4160 VAC Bus Supply Breakers are OPEN.
4. Another operator has manually started the 1C Diesel Generator (DG).
5. 1C DG is operating at 900 RPM.
6. The 1C DG Output Breaker is OPEN.
7. The 1C DG Control Switch is in the AT ENGINE position
8. 1D PSW Pump is operating.
9. All station DC power is available.
10. A fire was NOT the cause of the Control Room evacuation.

INITIATING CUES:

IAW 34AB-R43-001-1, starting at step 4.6, ENERGIZE the
1G 4160VAC Emergency Bus.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

NOTE: **IF** any Diesel Generator (DG) surveillance is in progress, **DOUBLE** hearing protection will be **REQUIRED** to be worn while performing this JPM.

NOTE: If it is desired to have the applicant open local panel 1R43-P001C to demonstrate knowledge of the location of the speed control switch, then a key (Key 1R43-1) is required to perform this JPM. If the applicant will not be required to open the panel, a picture of the switch may be used to simulate this part of the task and the key will NOT be required.

NOTE: This JPM is written to be performed on the 1C DG. **If** 1C DG is out of service for plant maintenance, then substitute the letter “A” for the letter “C” throughout this JPM and complete on the 1A DG.

START TIME:__________

1.	Applicant reviews the procedure.	Applicant has reviewed step 4.6 of 34AB-R43-001-1.	

PROMPT: **IF** the applicant addresses operation of other 4160VAC Buses, as the Shift Supervisor, **INFORM** the applicant that ANOTHER operator will address any remaining buses.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
2.	Confirm generator voltage comes up to rated voltage (4160V), as indicated on local panel 1R43-P001C, IF NOT, establish voltage by performing the following: (34AB-R43-001-1 step 4.6.1)	At 1R43-P001C, the applicant evaluates the EDG 1C out put voltages.	

PROMPT: **WHEN** the applicant has located the generator output voltage meter (local panel, 1R43-P001C) **INDICATE** using a pointing device that the indicator is reading "0" VAC.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**3.	Place Diesel Generator control switch on Diesel Generator Control Panel to the REMOTE position. (34AB-R43-001-1 step 4.6.1.a.(1)	The applicant has placed the Diesel Generator control switch, located on 1R43-P003C, Diesel Generator Control Panel, to the REMOTE position	

PROMPT: **AFTER** the applicant has placed the Diesel Generator control switch, located on 1R43-P003C, Diesel Generator Control Panel, to the REMOTE position **AND** has located the generator output voltage meter (local panel, 1R43-P001C) **INDICATE** using a pointing device that the indicator is reading 4,160 VAC.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**4.	WHEN voltage develops, Place the control switch back to the AT ENGINE position. (34AB-R43-001-1 step 4.6.1.a.(2)	The applicant has placed the Diesel Generator control switch, located on 1R43-P003C, Diesel Generator Control Panel, to the AT ENGINE position	

NOTE: The applicant may not address the steps which correspond to the 1A and 1B diesel generators. It is acceptable for the operator to jump to step 4.6.1.d to address establishing voltage for the 1C diesel generator.

PROMPT: **IF** the applicant asks the status of the 1A EDG **INFORM** the applicant that 1A EDG is running and tied to its respective bus.

PROMPT: **IF** the applicant asks the status of the 1A and 1C PSW pumps **INFORM** the applicant that 1A PSW pump is running.

PROMPT: **IF** the applicant asks the status of the 1B EDG **INFORM** the applicant that 1B EDG is running and tied to its respective Unit 1 4160 VAC bus.

PROMPT: **IF** the applicant asks the status of the Standby PSW pump **INFORM** the applicant that Standby PSW pump is running.

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: The status of the 1D PSW pump is "OPERATING" (provided to the applicant on the **Initial Conditions sheet** of this JPM). The power supply to 1B PSW Pump is 1G 4KV bus, which is currently de-energized.

5.	IF 1C EDG is operating, confirm either the 1B or 1D, Plant Service Water Pump, is in operation. (34AB-R43-001-1 step 4.6.1.d)	The applicant has determined that 1C EDG is operating and that 1D PSW pump is operating.	

PROMPT: **WHEN** the applicant asks the status of the 1B and 1D PSW pumps **INFORM** the applicant to refer to the Initial Conditions sheet.

6.	IF Diesel Generator output voltage is 4160V and frequency is between 60 and 60.5 Hz, verify the Diesel Generator output breaker is closed. If output breaker is still open continue to step 4.7. (34AB-R43-001-1 step 4.6.2)	The applicant has confirmed that diesel generator output voltage is 4160V using generator output voltage meter (local panel, 1R43-P001C).	

PROMPT: **WHEN** the applicant has located the generator output voltage meter (local panel, 1R43-P001C) **INDICATE**, using a pointing device, that the indicator is reading 4,160 VAC.

7.	IF Diesel Generator output voltage is 4160V and frequency is between 60 and 60.5 Hz, verify the Diesel Generator output breaker is closed. If output breaker is still open continue to step 4.7. (34AB-R43-001-1 step 4.6.2)	The applicant has confirmed that diesel generator frequency is between 60 hertz using generator frequency meter (local panel, 1R43-P001C).	

PROMPT: **WHEN** the applicant has located the generator frequency meter (local panel, 1R43-P001C) **INDICATE** using a pointing device that the indicator is reading 60 hertz.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
8.	IF Diesel Generator output voltage is 4160V and frequency is between 60 and 60.5 Hz, verify the Diesel Generator output breaker is closed. If output breaker is still open continue to step 4.7. (34AB-R43-001-1 step 4.6.2)	The applicant has confirmed that the Diesel Generator output breaker is NOT closed by observing the output breaker "GREEN" light indication located on 1E 4,160 VAC switchgear, Frame 5.	

PROMPT: **WHEN** the applicant has located the diesel generator output breaker open/closed light indications (1R22-S005 4160V STA SERV SWGR 1E DIESEL BUILDING (1E SWGR ROOM) Frame 5)) **INFORM** the applicant that the "GREEN" light is ILLUMINATED.

ALTERNATE PATH STARTS HERE
(Step 9)

NOTE: At this point the applicant will go to section 4.7 to force the output breaker to close by lowering and then raising 1C DG speed/frequency.

PROMPT: **IF** the applicant asks the status of the 1A EDG **INFORM** the applicant that 1A EDG is running and tied to its respective bus.

PROMPT: **IF** the applicant asks the status of the 1B EDG **INFORM THE APPLICANT** that 1B EDG is running and tied to its respective bus.

NOTE: The applicant will have enough knowledge to determine the status of the 1C EDG without the need for prompting in the next step.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
9.	IF required Diesel Generators are operating, AND their respective 4160V bus is NOT energized, THEN attempt to close the Diesel Generator output breaker(s) as follows: (34AB-R43-001-1 step 4.7.1)	The applicant has determined that 1C EDG is operating but NOT tied to its respective bus.	
10.	Confirm normal AND alternate supply breakers to 4160V Bus 1E (1G, 1F, 2F) are OPEN: (34AB-R43-001-1 step 4.7.1.a)	The applicant has continued to the assess step 4.7.1.a bulleted list.	

PROMPT: **IF** the applicant addresses the Normal and Alternate Supply Breakers for 4160 VAC buses 1E, 1F and/or 2F, **INFORM** the applicant that another operator is addressing these buses.

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: The 1st Bullet is N/A since the 1A EDG is running and tied to its 4,160 VAC emergency bus.

NOTE: The 2nd bullet is N/A since the 1A EDG is running and tied to its 4,160 VAC emergency bus.

11.	Confirm 4160V Bus 1G NORMAL SUPPLY ACB 135716 is open (3rd Bullet). (34AB-R43-001-1 step 4.7.1.a)	The applicant has determined that the 4160V Bus 1G NORMAL SUPPLY ACB 135716 is OPEN.	

PROMPT: **IF** the applicant asks the status of the 4160V Bus 1G NORMAL SUPPLY breaker **INFORM** the applicant to review the Initial Conditions sheet.

12.	Confirm 4160V BUS 1G ALTERNATE SUPPLY ACB 135715 is open (4th Bullet) (34AB-R43-001-1 step 4.7.1.a)	The applicant has determined that the 4160V Bus 1G ALTERNATE SUPPLY ACB 135715 is OPEN	

PROMPT: **IF** the applicant asks the status of the 4160V Bus 1G ALTERNATE SUPPLY breaker **INFORM** the applicant to review the Initial Conditions sheet.

NOTE: The 5th Bullet is N/A since the 1B EDG is running and tied to its Unit 1 4,160 VAC emergency bus.

NOTE: The 6th Bullet is N/A since the 1B EDG is running and tied to its Unit 1 4,160 VAC emergency bus.

NOTE: The 7th Bullet is N/A since the 1B EDG is running and tied to its Unit 1 4,160 VAC emergency bus.

NOTE: The 8th Bullet is N/A since the 1B EDG is running and tied to its Unit 1 4,160 VAC emergency bus.

PROMPT: **IF** the applicant interprets that the 4160V Bus 2F ALTERNATE SUPPLY breaker must be verified open, then **INFORM** the applicant that another operator has confirmed that the 4160V Bus 2F ALTERNATE SUPPLY breaker is OPEN.

NOTE: Step 4.7.1.b is N/A since the 1B EDG is already running and tied to its Unit 1 emergency bus.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: Step 4.7.1.c is N/A since the 1B EDG is already running and tied to its Unit 1 emergency bus.

NOTE: In evaluating step 4.7.2 the applicant will proceed to step 4.7.3.i due to the Main Control Room evacuation. This action was previous completed by step 4.6.1.a.

13.	IF the Main Control room is ACCESSIBLE perform step 4.7.3.a, OR IF the Main Control room is NOT ACCESSIBLE perform 4.7.3.i.(1). (34AB-R43-001-1 step 4.7.2)	The applicant has evaluated step 4.7.2 and has proceeded to step 4.7.3.i.(1).	

14.	CONFIRM Diesel Generator output voltage is at 4160 VAC at panel 1R43-P001C. (34AB-R43-001-1 step 4.7.3.i)	The applicant has determined that generator output voltage is 4,160 VAC using voltage meter on 1R43-P001C.	

PROMPT: **WHEN** the applicant has located the generator output voltage meter (local panel, 1R43-P001C) **INDICATE**, using a pointing device, that the indicator is reading 4,160 VAC.

NOTE: Step 4.7.3.j is N/A since the 1C EDG output voltage was established in step 4.6.1.a.

NOTE: The applicant can adjust the Diesel Generator 1C speed from EITHER 1R43-P001C, using the SPEED CONTROL switch OR from Diesel Generator 1C Governor Speed Setting knob (Top Right Knob on the Governor).

NOTE: **IF** the Applicant uses the Speed Setting Switch then steps 16 and 17 are **CRITICAL**, and 19 and 20 become N/A.

IF the Applicant uses the Speed Setting Knob on the diesel generator governor then steps 19 and 20 will be **CRITICAL** and 16 and 17 become N/A.

15.	To force automatic breaker closure, perform either step 4.7.3.k.(1) or step 4.7.3.k.(2). (34AB-R43-001-1 step 4.7.3.k)	The applicant has selected to use either step 4.7.3.k.(1) or step 4.7.3.k.(2).	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: **IF** the applicant performs 4.7.3.k.(1), then **PROVIDE** Figure 1 & 2 of the Speed Adjust switch (located inside 1R43-P001C, bottom left door).

****16.**	Using Diesel Gen 1C Diesel Generator Speed Setting Switch, (located inside 1R43-P001C, bottom left door) LOWER generator frequency to 57 HERTZ. (Key 1R43-1) (34AB-R43-001-1 step 4.7.3.k.(1))	The applicant has placed Diesel Gen 1C Diesel Generator Speed Setting Switch, (located inside 1R43-P001C, bottom left door) in the LOWER position and lowers generator frequency to <= 57 HERTZ.	

PROMPT: **WHEN** the applicant has located 1R43-R766C, GEN FREQ METER (1R43-P001C) indication meter (local panel, 1R43-P001C) **INDICATE** using a pointing device that the indicator is reading 57 hertz.

****17.**	Then INCREASE frequency to 60 and 60.5 Hertz, to force automatic breaker closure, AND ***************************** (34AB-R43-001-1 step 4.7.3.k.(1)(a)).	The applicant has placed the generator speed control switch in the RAISE position and increased generator frequency (range of 60 - 60.5 hz is acceptable).	

PROMPT: **WHEN** the applicant has located 1R43-R766C, GEN FREQ METER (1R43-P001C) indication meter (local panel, 1R43-P001C) **INDICATE**, using a pointing device, that the indicator is reading 60 hertz.

18.	************************** AND verify the diesel generator output breaker CLOSES. (34AB-R43-001-1 step 4.7.3.k.(1)(a)).	The applicant has verified that the diesel generator output breaker is CLOSED by observing breaker "RED" light indications on 1E 4,160 VAC switchgear, Frame 5.	

PROMPT: **WHEN** the applicant has located the output breaker open/closed light indications (1R22-S005 4160V STA SERV SWGR 1E DIESEL BUILDING (1E SWGR ROOM) Frame 5)) **INFORM** the applicant that the "RED" light is ILLUMINATED.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**19.	Using Diesel Gen 1C Diesel Generator Governor Speed Setting knob, LOWER generator frequency to 57 HERTZ (located on Governor). (34AB-R43-001-1 step 4.7.3.k.(2))	The applicant has rotated the Diesel Gen 1C Diesel Generator Governor Speed Setting knob, in the LOWER direction and lowers generator frequency to <= 57 hertz.	

PROMPT: **WHEN** the applicant has located 1R43-R766C, GEN FREQ METER (1R43-P001C) indication meter (local panel, 1R43-P001C) **INDICATE**, using a pointing device, that the indicator is reading "57 hertz".

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**20.	Then INCREASE frequency to 60 and 60.5 Hertz, to force automatic breaker closure, AND ****************************** (34AB-R43-001-1 step 4.7.3.k.(2)(a))	The applicant has rotated the generator Speed Setting knob, in the RAISE direction and increased generator frequency (range of 60 - 60.5 hz is acceptable).	

PROMPT: **WHEN** the applicant has located 1R43-R766C, GEN FREQ METER (1R43-P001C) indication meter (local panel, 1R43-P001C) **INDICATE** using a pointing device that the indicator is reading "60 hertz".

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
21.	************************** AND verify the diesel generator output breaker CLOSES. (34AB-R43-001-1 step 4.7.3.k.(2)(a)	The applicant has verified that the diesel generator output breaker is CLOSED by observing breaker "RED" light indications on "1E" 4,160 VAC switchgear, Frame 5.	

PROMPT: **WHEN** the applicant located the output breaker open/closed light indications (1R22-S005 4160V STA SERV SWGR 1E DIESEL BUILDING (1E SWGR ROOM) Frame 5)) **INFORM** the applicant that the "RED" light is ILLUMINATED.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

PROMPT: **IF** the applicant addresses restoration of 4160 VAC Emergency Bus loads, as the Shift Supervisor, **INFORM** the applicant that this will be performed by another operator.

END TIME:__________

NOTE: The terminating cue shall be given to the applicant when any one of the following is met:

- After JPM step #18 or #21 is complete.
- With NO reasonable progress, the applicant exceeds double the allotted time.
- Applicant states the task is complete.

TERMINATING CUE: We will stop here.

EVALUATOR – **PICK UP** the Initiating Cue sheet and the picture of the Speed Control switch (if used).

Summary of JPM Attributes

JPM 2019-301 Plant 2:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	6

Step 3 EDG control switch to Remote	Flashes generator field
Step 4 EDG control switch to At Engine	Return generator control to local.
Step 16 Speed Setting switch to 57 Hz	Reset EDG breaker auto close logic
Step 17 Speed Setting switch to 60 Hz	Connects EDG to the bus
Step 19 Speed Setting knob to 57 Hz	Reset EDG breaker auto close logic
Step 20 Speed Setting knob to 60 Hz	Connects EDG to the bus

NOTE: If the Applicant uses the Speed Setting Switch then steps 16 and 17 are **CRITICAL**, and if the Applicant uses the Speed Setting Knob then steps 19 and 20 are **CRITICAL**.

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	21
Time to Perform JPM	<45 min	20 min

Normal / Faulted / Alternate Path

Alternate Path — IAW 34AB-R43-001-1, step 4.6.1, whet the generator is flashed and the EDG fails to connect to the bus the operatior must branch to step 4.7 to force the EDG outputbreaker to close

Setting (administered)

Plant

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Is LOD “1” or “5”	NO	NO

Figure 1

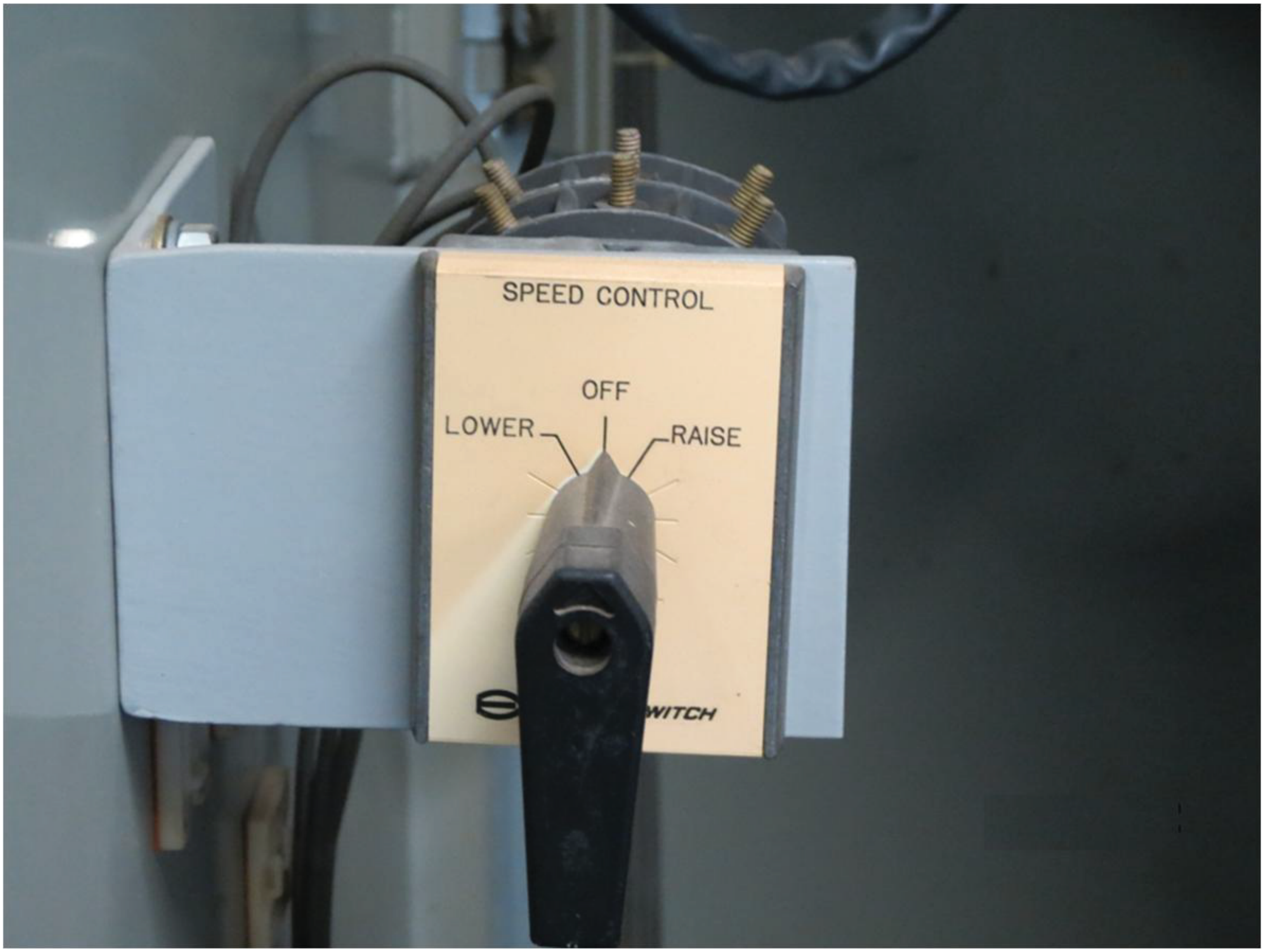


Figure 2

UNIT 1

READ TO THE APPLICANT

INITIAL CONDITIONS:

1. The Main Control Room has been evacuated.
2. The 1G 4160VAC Emergency Bus is DE-ENERGIZED.
3. ALL 1G 4160 VAC Bus Supply Breakers are OPEN.
4. Another applicant has manually started the 1C Diesel Generator (DG).
5. 1C DG is operating at 900 RPM.
6. The 1C DG Output Breaker is OPEN.
7. The 1C DG Control Switch is in the AT ENGINE position
8. 1D PSW Pump is operating.
9. All station DC power is available.
10. A fire was NOT the cause of the Control Room evacuation.

INITIATING CUES:

IAW 34AB-R43-001-1, starting at step 4.6, ENERGIZE the 1G 4160VAC Emergency Bus.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
PLANT 3 RO & SRO-I

Title: **From Outside the Control Room during a Control Room Evacuation, Maximize CRD System Flow**		**Version:** 1.0
Author: Arthur Genereux	**Media Number:** 2019-301 PLANT 3	**Time:** 25 Minutes
Line Technical Review By (N/A for minor revisions) **N/A**		**Date:** **N/A**
Reviewed by Instructional Technologist or designee (N/A for minor revisions) **N/A**		**Date:** **N/A**
Charlie Edmund		**Date:** **2/17/2019**

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Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 PLANT 3

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	2/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	**From Outside the Control Room during a Control Room Evacuation, Maximize CRD System Flow**
JPM NUMBER:	**2019-301 PLANT 3**
TASK STANDARD:	The task shall be completed when CRD Pump "A" has been started and is injecting to the Reactor per 31RS-OPS-001-1, Attachment 5, "Maximizing CRD System Flow," **OR** 31RS-C11-001-2, "Maximizing CRD System Flow" section.

TASK NUMBER: 001.024

OBJECTIVE NUMBER: 001.024.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 3.71

SRO 4.00

K/A CATALOG NUMBER: 295016AA1.06

K/A CATALOG JTA IMPORTANCE RATING:

RO 4.10

SRO 4.10

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 1**	**Unit 2**
	31RS-OPS-001-1 (Version 6.2)	31RS-C11-001-2 (Version 1.8) 31RS-OPS-001-2 (Version 7.2)

REQUIRED MATERIALS:	**Unit 1**	**Unit 2**
	31RS-OPS-001-1 (Version 6.2)	31RS-C11-001-2 (Version 1.8)

APPROXIMATE COMPLETION TIME: 25 Minutes

SIMULATOR SETUP: N/A

EVALUATOR COPY

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An event has occurred which requires the Control Room to be evacuated.
2. The Reactor scrammed due to a loss of feedwater (4KV Buses “1C” and “1D” fault).
3. CRD Pump “1B” is running.
4. No trip signals are present on CRD Pump “1A.”
5. The CRD Return Line Isolation valve, 1C11-F082 is open.
6. 31RS-OPS-001-1, “Shutdown from Outside the Control Room” is in progress.
7. Additional operators are stationed in other areas for local operations, as needed.
8. Pre-Job Brief is NOT required.

INITIATING CUES:

Maximize CRD system flow to the vessel using both CRD pumps per Attachment 5 of 31RS-OPS-001-1.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:________

PROMPT: **IF** the operator addresses CRD Pump "1B," **INFORM** the operator it is operating and its Transfer switch 1C82-S4 is in EMERGENCY position at Remote S/D Panel 1H21-P177.

1.	ADJUST the manual output on the following FCV Man/Auto Stations to zero: • 1C11-D009A • *********** (Attachment 5 step 1)	At location 130RAR03, the Operator ADJUSTS DRIVE WTR FLOW CONTROLLER, 1C11-D009A manual output to ZERO.	
2.	ADJUST the manual output on the following FCV Man/Auto Stations to zero: • *********** • 1C11-D009B (Attachment 5 step 1)	At location 130RAR03, the Operator ADJUSTS DRIVE WTR FLOW CONTROLLER, 1C11-D009B manual output to ZERO.	

NOTE: 0% is closed, 100% is full open.

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**3.	PLACE the following FCV Man/Auto stations in MANUAL: • 1C11-D009A • *********** (Attachment 5 step 2)	At location 130RAR03, the Operator PLACES DRIVE WTR FLOW CONTROLLER, 1C11-D009A in MANUAL.	
**4.	PLACE the following FCV Man/Auto stations in MANUAL: • *********** • 1C11-D009B (Attachment 5 step 2)	At location 130RAR03, the Operator PLACES DRIVE WTR FLOW CONTROLLER, 1C11-D009B in MANUAL.	
5.	ADJUST the manual output of 1C11-D012, Press Control Vlv Man/Auto Station, to 100%. (Attachment 5 step 3)	At location 130RAR04, the Operator ADJUSTS PRESS CONTROL VLV CONTROLLER, 1C11-D012, Output to 100%.	
**6.	PLACE 1C11-D012 in MANUAL. (Attachment 5 step 4)	At location 130RAR04, the Operator PLACES PRESS CONTROL VLV CONTROLLER, 1C11-D012 in MANUAL.	

(** Indicates critical step)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
7.	OPEN 1C11-F003, Drive Press Cntl Vlv, and 1C11-F005, Return To Vessel Flow Control, as follows: OPEN the following breakers: 1C11-F003 1R25-S116 Brkr 27 130RFR02 ************************************ (Attachment 5 step 5.a)	At panel 1R25-S116 (130RFR02), the Operator OPENS BRKR 27, (1C11-F003).	
8.	OPEN 1C11-F003, Drive Press Cntl Vlv, and 1C11-F005, Return To Vessel Flow Control, as follows: OPEN the following breakers: ************************************ 1C11-F005 1R25-S116 Brkr 28 130RFR02 (Attachment 5 step 5.a)	At panel 1R25-S116 (130RFR02), the Operator OPENS BRKR 28, (1C11-F005).	
**9.	Manually OPEN the following valves by using the handwheel on the motor: • 1C11-F003, Drive Press Cntl Vlv • ************************ (Attachment 5 step 5.b)	At location 130RAR04, the Operator manually OPENS DRIVE PRESS CNTL VLV, 1C11-F003.	
**10.	Manually OPEN the following valves by using the handwheel on the motor: • *********************** • 1C11-F005, Return To Vessel Flow Control. (Attachment 5 step 5.b)	At location 130RAR04, the Operator manually OPENS DRIVE PRESS CNTL VLV, 1C11-F005.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
11.	FULLY OPEN the following manual valves: 1C11-F004, Drive Water Manual Pressure Control Valve 1C11-F006, Return to Vessel Manual Flow Control Valve 1C11-F128, Cooling Water Manual Pressure Control Valve 1C11-F153, Outlet from 1C11-F128 1C11-F155, Inlet to 1C11-F128 1C11-F082, Return Line Isolation Valve 1C11-F046A, Flow Control Valve 1C11-F002A Inlet Isolation 1C11-F047A, Flow Control Valve 1C11-F002A Outlet Isolation 1C11-F046B, Flow Control Valve 1C11-F002B Inlet Isolation 1C11-F047B, Flow Control Valve 1C11-F002B Outlet Isolation (Attachment 5 step 6)	At location 130RAR03, the Operator Fully OPENS following valves: **1C11-F004**, Drive Water Manual Pressure Control Valve **1C11-F006**, Return to Vessel Manual Flow Control Valve **1C11-F128**, Cooling Water Manual Pressure Control Valve **1C11-F153**, Outlet from 1C11-F128 **1C11-F155**, Inlet to 1C11-F128 **1C11-F082**, Return Line Isolation Valve (OPENED in Initial Conditions) **1C11-F046A**, Flow Control Valve 1C11-F002A Inlet Isolation **1C11-F047A**, Flow Control Valve 1C11-F002A Outlet Isolation **1C11-F046B**, Flow Control Valve 1C11-F002B Inlet Isolation **1C11-F047B**, Flow Control Valve 1C11-F002B Outlet Isolation	

PROMPT: **WHEN** the operator addresses closing 1C11-F248A and 1C11-F248B in the Northwest diagonal, **INFORM** the operator that another operator placed both these valves in close. (Attachment 5 step 7)

PROMPT: **IF** the operator addresses the Condensate System, as the Shift Supervisor, **INFORM** the operator that it is not available due to the fault on 4KV Buses "1C" and "1D." (Operator should N/A Attachment 5 step 8)

PROMPT: **WHEN** the operator addresses starting CRD Pump "1A," as the Shift Supervisor, **INFORM** the operator that another operator has placed CRD Pump "1A" Transfer Switch in EMERGENCY on Remote S/D Panel 1H21-P176 and has started the pump. (Attachment 5 step 9. and 10)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: Pump Suction Crosstie valve 1C11-F117 should not be opened since both CRD pumps are available. (Operator should N/A Attachment 5 step 12)

NOTE: For the following step, another Operator is stationed in the diagonal to report parameter values as requested.

**12.	Using 1C11-D009A(B) OPEN 1C11-F002A(B), Flow Control Valve, until CRD pump discharge pressure is 1170 PSIG, as indicated on 1C11-PI-R008, Pressure Indicator. (Attachment 5 step 13.a or 13.b)	At location 130RAR03, the Operator USES DRIVE WTR FLOW CONTROLLER, 1C11-D009A(B) to OPEN 1C11-F002A(B) to obtain CRD pump discharge pressure of 1170 psig on PRESSURE INDICATOR, 1C11-R008 (111RBR02).	

PROMPT: **WHEN** the operator addresses discharge pressure, **INDICATE** for the operator that another operator is monitoring CRD pump discharge pressure and it is 1170 psig.

NOTE: After the Operator demonstrates opening 1C11-D009A(B) to obtain 1170 psig, state, "We'll Stop Here".

End Time:_________

NOTE: The terminating cue shall be given to the operator when any of the following conditions are met:

- Operator completes step 12 of this JPM.
- With no reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

(Indicates critical step)**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An event has occurred which requires the Control Room to be evacuated.
2. The Reactor scrammed due to a loss of feedwater (4KV buses “2C” and “2D” fault).
3. CRD Pump “2B” is running.
4. No trip signals are present on CRD Pump “2A.”
5. The CRD Return Line Isolation valve, 2C11-F082, is open.
6. 31RS-OPS-001-2, “Shutdown From Outside Control Room” is in progress.
7. Additional operators are stationed in other areas for local operations, as needed.
8. Pre-Job Brief is NOT required.

INITIATING CUES:

Maximize CRD System flow to the vessel using both CRD pumps per 31RS-C11-001-2.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

PROMPT: **IF** the operator addresses CRD Pump "2B", **INFORM** the operator it is operating and its Transfer switch 2C82-S71 is in EMERG position at the Remote S/D Panel.

PROMPT: CRD Pump "2A" may be started anytime during the performance of this JPM. **IF** the operator addresses this, **INFORM** the operator that another operator has started CRD Pump "2A."

1.	ADJUST the manual output on the following Drive Wtr Flow Controller stations to ZERO: • 2C11-D009A • *********** (Step 4.3.1)	At location 130RAR23, the Operator ADJUSTS DRIVE WTR FLOW CONTROLLER, 2C11-D009A manual output to ZERO.	
2.	ADJUST the manual output on the following Drive Wtr Flow Controller stations to ZERO: • *********** • 2C11-D009B (Step 4.3.1)	At location 130RAR23, the Operator ADJUSTS DRIVE WTR FLOW CONTROLLER, 2C11-D009B manual output to ZERO.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: 0% is closed, 100% is full open

**3.	PLACE the following Drive Wtr Flow Controller stations in MAN (manual): • 2C11-D009A • *********** (Step 4.3.2)	At location 130RAR23, the Operator PLACES DRIVE WTR FLOW CONTROLLER, 2C11-D009A in MAN.	
**4.	PLACE the following Drive Wtr Flow Controller stations in MAN (manual): • *********** • 2C11-D009B (Step 4.3.2)	At location 130RAR23, the Operator PLACES DRIVE WTR FLOW CONTROLLER, 2C11-D009B in MAN.	
5.	ADJUST 2C11-D012, manual output of the Cooling Wtr Flow Controller station, to 100%. (Step 4.3.3)	At location 130RAR23, the Operator PLACES COOLING WTR FLOW CONTROLLER, 2C11-D012, Output at 100%.	
**6.	PLACE 2C11-D012 in MAN (manual). (Step 4.3.4)	At location 130RAR23, the Operator PLACES COOLING WTR FLOW CONTROLLER, 2C11-D012 in MAN.	
7.	OPEN the following breakers: • 2R24-S012, breaker 23A, 2C11-F005 • ***************************** (Step 4.3.5)	At panel 2R24-S012, the Operator OPENS BRKR 23A (2C11-F005).	
8.	OPEN the following breakers: • ***************************** • 2R24-S012, breaker 23B, 2C11-F003 (Step 4.3.5)	At panel 2R24-S012, the Operator OPENS BRKR 23B (2C11-F003).	
**9.	Using the handwheel on the motors, manually OPEN the following valves: 2C11-F003, Drive Header Pressure Control Valve *************************** (Step 4.3.6)	At location 130RAR23, the Operator manually OPENS CRD DRIVE HEADER PRESSURE CONTROL VALVE, 2C11-F003.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**10.	Using the handwheel on the motors, manually OPEN the following valves: ************************** 2C11-F005, Return to Vessel Flow Control Valve (Step 4.3.6)	At location 130RAR23, the Operator manually OPENS CRD RETURN TO VESSEL FLOW CONTROL VALVE, 2C11-F005.	
11.	Confirm FULLY OPEN/OPEN the following manual valves: 2C11-F004, Drive Water Manual Pressure Control Valve 2C11-F006, Return to Vessel Manual Flow Control Valve 2C11-F128, Cooling Water Manual Pressure Control Valve 2C11-F129, Outlet from 2C11-F128 2C11-F136, Inlet to 2C11-F128 2C11-F082, Return Line Isolation Valve 2C11-F046A, Flow Control Valve 2C11-F002A Inlet Isolation 2C11-F046B, Flow Control Valve 2C11-F002B Inlet Isolation 2C11-F047A, Flow Control Valve 2C11-F002A Outlet Isolation 2C11-F047B, Flow Control Valve 2C11-F002B Outlet Isolation (Step 4.3.7)	At location 130RAR23, the Operator OPENS the following valves: **2C11-F004**, Drive Water Manual Pressure Control Valve **2C11-F006**, Return to Vessel Manual Flow Control Valve **2C11-F128**, Cooling Water Manual Pressure Control Valve **2C11-F129**, Outlet from 2C11-F128 **2C11-F136**, Inlet to 2C11-F128 **2C11-F082**, Return Line Isolation Valve (OPENED in Initial Conditions) **2C11-F046A**, Flow Control Valve 2C11-F002A Inlet Isolation **2C11-F046B**, Flow Control Valve 2C11-F002B Inlet Isolation **2C11-F047A**, Flow Control Valve 2C11-F002A Outlet Isolation **2C11-F047B**, Flow Control Valve 2C11-F002B Outlet Isolation	

PROMPT: **WHEN** the operator addresses closing 2C11-F248A, 2C11-F248B, and 2C11-F249 in the SW diagonal, **INFORM** the operator that another operator placed these valves in close. (Step 4.3.8)

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

PROMPT: **WHEN** the operator addresses starting CRD Pump "2A," as the Shift Supervisor, **INFORM** the operator that another operator has started the pump. (Step 4.3.9)

NOTE: Pump Suction Crosstie valve 2C11-F117 should not be opened since both CRD pumps are available. (Operator should N/A Step 4.3.10)

NOTE: For the following step, another Operator is stationed in the diagonal to report parameter values as requested.

****12.**	Using 2C11-D009A(B), OPEN 2C11-F002A(B), Flow Control Valve, until CRD pump discharge pressure is 1220 PSIG, as indicated on 2C11-R008, Pressure Indicator (at 108RAR24). (Step 4.3.11)	At location 130RAR23, the Operator USES DRIVE WTR FLOW CONTROLLER, 2C11-D009A(B) to OPEN 2C11-F002A(B) to obtain CRD pump discharge pressure of 1220 psig on PRESSURE INDICATOR, 2C11-R008 (108RAR24).	

PROMPT: **WHEN** the operator addresses discharge pressure, **INDICATE** for the operator that another operator is monitoring CRD pump discharge pressure and it is 1220 psig.

NOTE: After the Operator demonstrates opening 2C11-D009A(B) to obtain 1220 psig, state, "We'll Stop Here".

End Time:_________

NOTE: The terminating cue shall be given to the operator when any of the following conditions are met:

- Operator completes step 12 of this JPM.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM 2019-301-PLANT 3:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	6

Step 3 1/2C11-D009A in Manual	Operator places in Manual to prevent valve from automatically repositioning (will control in manual to adjust discharge pressure).
Step 4 1/2C11-D009B in Manual	Operator places in Manual to prevent valve from automatically repositioning (will control in manual to adjust discharge pressure).
Step 6 1/2C11-D012 in Manual	Operator places controller in manual to prevent valve from automatically repositioning (valve to remain 100% open).
Step 9 Open 1/2C11-F003	Operator manually opens 1/2C11-F003 to increase system flow.
Step 10 Open 1/2C11-F005	Operator manually opens 1/2C11-F005 to increase system flow.
Step 12 Open 1/2C11-D009A/B	Operator manually opens 1/2C11-D009A/B to increase system flow and maintain system pressure above 1170 psig/1220 psig to prevent pump runout.

Number of JPM Steps	<30	12
Time to Perform JPM	<45 min	25 min

Normal / Faulted / Alternate Path

Normal — Operator told to maximize CRD System flow.

Setting (administered)

Plant

Is LOD "1" or "5"	NO	NO

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An event has occurred which requires the Control Room to be evacuated.
2. The Reactor scrammed due to a loss of feedwater (4KV Buses “1C” and “1D” fault).
3. CRD Pump “1B” is running.
4. No trip signals are present on CRD Pump “1A.”
5. The CRD Return Line Isolation valve, 1C11-F082 is open.
6. 31RS-OPS-001-1, “Shutdown from Outside the Control Room” is in progress.
7. Additional operators are stationed in other areas for local operations, as needed.
8. Pre-Job Brief is NOT required.

INITIATING CUES:

Maximize CRD system flow to the vessel using both CRD pumps per Attachment 5 of 31RS-OPS-001-1.

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. An event has occurred which requires the Control Room to be evacuated.
2. The Reactor scrammed due to a loss of feedwater (4KV buses “2C” and “2D” fault).
3. CRD Pump “2B” is running.
4. No trip signals are present on CRD Pump “2A.”
5. The CRD Return Line Isolation valve, 2C11-F082, is open.
6. 31RS-OPS-001-2, “Shutdown From Outside Control Room” is in progress.
7. Additional operators are stationed in other areas for local operations, as needed.
8. Pre-Job Brief is NOT required.

INITIATING CUES:

Maximize CRD System flow to the vessel using both CRD pumps per 31RS-C11-001-2.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
RO ADMIN 1

Title: IRM Alternate Power Checks Prior To Taking The Mode Switch To Run (Admin)		Version: 1.0
Author: ANTHONY BALL	Media Number: 2019-301 RO ADMIN 1	Time: 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		Date: N/A
Reviewed by Instructional Technologist or designee: N/A		Date: N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		Date 05/15/2019

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 RO ADMIN 1

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	**IRM Alternate Power Checks Prior To Taking The Mode Switch To Run (Admin)**
JPM NUMBER:	**2019-301 RO ADMIN 1**
TASK STANDARD:	This task shall be successfully completed when all of the JPM Critical Steps corresponding to 34GO-OPS-001-1, Attachment 15, have been correctly performed to determine that Average percent power calculated is higher then current APRM power readings and an evaluation of power level indication is required.

TASK NUMBER: xxx.xxx

OBJECTIVE NUMBER: xxx.xxx.x

PLANT HATCH JTA IMPORTANCE RATING:

RO x.xx

SRO x.xx

K/A CATALOG NUMBER: G2.1.23

K/A CATALOG JTA IMPORTANCE RATING:

RO 4.3

SRO 4.0

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 1**	**Unit 2**
	34GO-OPS-001-1 (Ver 45.2)	N/A

REQUIRED MATERIALS:	**Unit 1**	**Unit 2**
	34GO-OPS-001-1 Attachment 15 (Ver 45.2)	N/A

APPROXIMATE COMPLETION TIME: 15 Minutes

SIMULATOR SETUP: N/A

EVALUATOR COPY

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Reactor Startup is in progress.
2. The crew is making preparations to startup the Steam Jet Air Ejector prior to securing the Mechanical Vacuum Pump.
3. All APRMs are currently reading 4.0% power.
4. Pre-Job Brief is NOT required.

INITIATING CUES:

IAW 34GO-OPS-001-1, perform Alternate Power Level check per Attachment 15.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

PROMPT: **AT** this time **GIVE** the operator **Attachment 1** (34GO-OPS-001-1, ATTACHMENT 15).

PROMPT: **AT** this time, **GIVE** the Operator **Attachment 2** of this JPM (IRM Data).

1.	The operator identifies where he will obtain IRM power and range information to record on Attachment 15.	The operator identifies where the IRM power information is obtained, At 1H11-P603.	

NOTE: ATTACHMENT 3 is the marked up answer key.

2.	The operator copies the IRM range and power level data onto the copy of 34GO-OPS-001-1 Attachment 15.	Using the copy of 34GO-OPS-001-1 Attachment 15 the data is recorded by operator.	

****3.**	The operator performs the calculation to the IRM data.	The operator uses the recorded IRM data and MULTIPLIES it by the correct constant of (0.212).	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

PROMPT: **IF** the operator request that the Calculations be verified, **THEN** as another operator perform verification but **DO NOT** correct any errors.

****4.**	The operator determines that Average % power is greater than APRM power settings.	Using the Average % power, the operator DETERMINES that APRMs readings are NOT greater than the Average IRM power.	

****5.**	The operator determines an evaluation of power level is required.	The operator informs the Shift Supervisor that an evaluation of power level indication is required.	

END TIME:__________

NOTE: The terminating cue shall be given to the Operator when:

- After JPM step #5 is complete.
- With NO reasonable progress, the Operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

EVALUATOR – **PICK UP** the Initiating Cue sheet **AND** **ATTACHMENT 1& 2**.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

Summary of JPM Attributes

JPM 2019-301 RO Admin 1:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	3

Step 3 Perform IRM calculations	Operator multiplies IRM data by (0.212) and averages results.
Step 4 Compares average IRM data to APRMs	Operator determines average IRM % power is > APRM reading.
Step 5 Determine evaluation of power is required	The operator informs the Shift Supervisor that an evaluation of power level indication is required

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	5
Time to Perform JPM	<45 min	15 min

Normal / Faulted / Alternate Path

Normal

Setting (administered)

Classroom

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Is LOD "1" or "5"	NO	NO

IRM ALTERNATE POWER CHECK

Record the IRM readings below AND
estimate reactor power using one of the following formulas:

For IRM Ranges 7 AND 8:
% Power = (IRM Reading) x (.0212)

For IRM Ranges 9 AND 10:
% Power = (IRM Reading) x (.212)

IRM A	RANGE 9	READING 18	% POWER 3.816
IRM C	RANGE 9	READING 20	% POWER 4.24
IRM E	RANGE 9	READING 20	% POWER 4.24
IRM G	RANGE 10	READING 20	% POWER 4.24
IRM B	RANGE 9	READING 18	% POWER 3.816
IRM D	RANGE 9	READING 22	% POWER 4.664
IRM F	RANGE 10	READING 20	% POWER 4.24
IRM H	RANGE 9	READING 18	% POWER 3.816

AVERAGE % POWER = 33.072 divided by 8 = 4.1

Check each APRM reading is greater than the average * IRM Reactor Power Value. UNSAT

Calculations IV ABC

*IF any APRM reading is NOT greater than the average IRM power,
perform an evaluation of power level indication to ensure that the APRM readings are conservative to actual reactor power.
The evaluation **will be attached** to this attachment.

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Reactor Startup is in progress.
2. The crew is making preparations to startup the Steam Jet Air Ejector prior to securing the Mechanical Vacuum Pump.
3. All APRMs are currently reading 4.0% power.
4. Pre-Job Brief is NOT required.

INITIATING CUES:

IAW 34GO-OPS-001-1, perform Alternate Power Level check per Attachment 15.

ATTACHMENT 1

IRM ALTERNATE POWER CHECK

1. **Record** the IRM readings below AND
   estimate reactor power using one of the following formulas:

   For IRM Ranges 7 AND 8:
   % Power = (IRM Reading) x (.0212)

   For IRM Ranges 9 AND 10:
   % Power = (IRM Reading) x (.212)

IRM A RANGE ________ READING ________ % POWER

IRM C RANGE ________ READING ________ % POWER

IRM E RANGE ________ READING ________ % POWER

IRM G RANGE ________ READING ________ % POWER

IRM B RANGE ________ READING ________ % POWER

IRM D RANGE ________ READING ________ % POWER

IRM F RANGE ________ READING ________ % POWER

IRM H RANGE ________ READING ________ % POWER

AVERAGE % POWER =______________________

Check each APRM reading is greater than the average * IRM Reactor Power Value. ______

Calculations IV ______

*IF any APRM reading is NOT greater than the average IRM power,
perform an evaluation of power level indication to ensure that the APRM readings are conservative to actual reactor power.
The evaluation **will be attached** to this attachment.

ATTACHMENT 2

IRM DATA

IRMS	RANGE	READING
A	9	18
C	9	20
E	9	20
G	10	20
B	9	18
D	9	22
F	10	20
H	9	18

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
RO ADMIN 2

Title		Version:
CONDUCT OF OPERATIONS, 34SV-SUV-019-2 SURVEILLANCE		1.0
Author: Anthony Ball	**Media Number:** 2019-301 RO Admin 2	**Time:** 30 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date:** **5/17/2019**

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 RO ADMIN 2

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	05/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 () **UNIT 2** (X)

TASK TITLE:	CONDUCT OF OPERATIONS, 34SV-SUV-019-2 SURVEILLANCE
JPM NUMBER:	2019-301 RO Admin 2
TASK STANDARD:	This task will be satisfactorily met when the student has completeted section 7.4 of 34SV-SUV-019-2, SURVEILLANCE CHECKS, and Informed the evaluator that LCO 3.6.2.1, Suppression Pool Average Temperature, is met.
TASK NUMBER:	
OBJECTIVE NUMBER:	

JTA IMPORTANCE RATING:

K/A CATALOG NUMBER: G2.1.7

RO N/A

SRO 4.70

OPERATOR APPLICABILITY: Reactor Operator (RO)

GENERAL REFERENCES:	**Unit 2**
	34SV-SUV-019-2 (Ver 41.20)

REQUIRED MATERIALS:	**Unit 2**
	34SV-SUV-019-2 (Ver 41.20) Calculators

APPROXIMATE COMPLETION TIME: 30 Minutes

SIMULATOR SETUP: NOT applicable

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 2 is operating at 100 % RTP.

2. 2T48-N303A, Torus Temperature, is out of service and inoperable.

3. 2T48-N308A, Torus Temperature, is out of service and inoperable.

4. 2T48-R647, Torus Bulk Average Temperature, on 2H11-P689 panel is indicating 95.0°F.

5. The Shift Supervisor has directed this surveillance to be completed as a paper version.

INITIATING CUES:

Complete section 7.4 of 34SV-SUV-019-2, SURVEILLANCE CHECKS, which evaluates Torus temperatures,

AND

Determine & Inform the evaluator of Bulk Average Torus Temperature

AND

Determine & Inform the evaluator whether LCO 3.6.2.1, Suppression Pool Average Temperature, is / is NOT met.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

PROMPT: **GIVE** the operator a copy of 34SV-SUV-019-2, Surveillance Checks, AND Attachments 1 & 2 of this JPM.

START TIME: __________

1.	Performs step 7.4.1 of 34SV-SUV-019-2.	From the R627/R627 recorder provided, the operator lists the temperature readings on the surveillance sheet with NO errors for; 2T47-R626, Pt 1, 2T48-N009A 92.5°F Pt 2, 2T48-N009C 92.5°F 2T47-R627, Pt 1, 2T48-N009B 94°F Pt 2, 2T48-N009D 93°F	
2.	Performs step 7.4.2 of 34SV-SUV-019-2.	The operator evaluates the temperatures from step 7.4.1 and determines the temperatute difference to be <3ºF AND enters a ✓ OR a 'SAT' per NOTE 'B'.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**3.	Performs step 7.4.3 of 34SV-SUV-019-2.	The operator calculates the readings in step 7.4.1 and determines the N009A-D average temperature is 93.0ºF.	
4.	Performs step 7.4.4 of 34SV-SUV-019-2.	From the SPDS screen provided, the operator records N009 Average temperature reading of 93.0°F.	
5.	Performs step 7.4.5 of 34SV-SUV-019-2.	The operator compares the average temperature reading in step 7.4.3 to the 7.4.4 SPDS N009 reading and concludes the temperatures do NOT differ by more than 2ºF AND enters a ✓ OR a 'SAT' per NOTE 'B'.	
6.	Performs step 7.4.6 of 34SV-SUV-019-2.	From the SPDS screen provided, the operator lists the temperature readings on the surveillance sheet with NO errors for; 2T48-N301A 98°F 2T48-N302A 98°F 2T48-N303A INOP 2T48-N304B 100°F 2T48-N305A 98°F 2T48-N306A 100°F 2T48-N307A 98°F 2T48-N308A INOP 2T48-N309A 98°F 2T48-N310A 101°F 2T48-N311A 101°F	
7.	Performs step 7.4.7 of 34SV-SUV-019-2.	The operator evaluates the temperatures from step 7.4.6 & step 7.4.3 and AND enters an '**UNSAT**' per NOTE 'B'.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**8.	Performs step 7.4.8 of 34SV-SUV-019-2.	The operator calculates the readings in step 7.4.6 and determines the N301-N311 average is 99.1ºF.	
9.	Performs step 7.4.9 of 34SV-SUV-019-2.	From the 2T48-R647 recorder provided, the operator lists the 2T48-R647 Torus water temperature reading of 95°F.	
10.	Performs step 7.4.10 of 34SV-SUV-019-2.	From the SPDS screen provided, the operator records SPDS Average Torus water temperature reading of 98°F.	
11.	Performs step 7.4.11 of 34SV-SUV-019-2.	The operator evaluates the temperatures from step 7.4.8 & step 7.4.9 and determines the temperatute difference to be >2ºF AND enters an '**UNSAT**' per NOTE 'B'.	
**12.	Performs step 7.4.12 of 34SV-SUV-019-2.	The operator calculates the Bulk Average Torus temperature using the bottom formula (**since 2T48-R647 is inop**) to be 96.05ºF. (Accept ±1°F due to rounding errors)	

NOTE: If the operator uses the top formula (R647 operable) then Torus Bulk Average temperature will be calculated (INCORRECTLY) to be 94.0ºF.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
13.	Performs step 7.4.13 of 34SV-SUV-019-2.	The operator evaluates the temperature difference from steps 7.4.10 & 7.4.12 and determines it to be <2ºF AND enters a ✓ OR a 'SAT' per NOTE 'B'.	
**14.	Determine & Inform the evaluator whether LCO 3.6.2.1, Suppression Pool Average Temperature, is / is NOT met.	The operator determines & informs that LCO 3.6.2.1, Suppression Pool Average Temperature, is met.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

END TIME: __________

NOTE: The terminating cue shall be given to the operator when:

- When the operator completes step 14.
- With NO reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM 2019-301 RO Admin 2:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	4

Step 3 Perform step 7.4.3	Operator determines the average temperature for instruments N009A-D.
Step 8 Perform step 7.4.8	Operator determines the average temperature for instruments N301-N311
Step 12 Perform step 7.4.12	Operator determines Bulk Average Torus temperature.
Step 14 Inform evaluator of LCO 3.6.2.1	Determines that LCO 3.6.2.1, Suppression Pool Average Temperature, is met.

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	14
Time to Perform JPM	<45 min	30 min

Normal / Faulted / Alternate Path

Normal

Setting (administered)

Classroom

Is LOD "1" or "5"	NO	NO

NOTE: IF any of the step 7.4 instruments are inoperable, refer to Attachment 2, Torus Temperature Monitoring.

7.4	PANEL - INSTRUMENT / TECH SPEC.	NOTE	OPER COND	FREQ	T/S OR OPER LIM	NIGHT	DAY
7.4.1	2H11-P657 - 2T47-R626, Pt 1, Torus Water Temp 2T48-N009A - 2T47-R626, Pt 2, Torus Water Temp 2T48-N009C -P650 - 2T47-R627, Pt 1, Torus Water Temp 2T48-N009B - 2T47-R627, Pt 2, Torus Water Temp 2T48-N009D (SR 3.6.2.1.1)	M U V	1,2,3	C	≤ 95°F (T.S. ≤ 100°F)		92.5 92.5 94.0 93.0
7.4.2	Confirm temperatures in 7.4.1 within 3°F (SR 3.3.3.1.1 for 3.3.3.1-1(9.))	B M	1,2,3	C			SAT or ✓
7.4.3	Calculate the average of operable points in 7.4.1.	M	1,2,3	C			93
7.4.4	2T48-N009 Average from SPDS	M	1,2,3	C			93
7.4.5	Confirm temperature in 7.4.3 within 2°F of 7.4.4.	B,M	1,2,3	C			SAT or ✓
7.4.6	SPDS Torus Temperature Diagnostic 2T48-N301A 2T48-N302A 2T48-N303A 2T48-N304B 2T48-N305A 2T48-N306A 2T48-N307A 2T48-N308A 2T48-N309A 2T48-N310A 2T48-N311A	M V	1,2,3	C			98 98 Inop 100 98 100 98 Inop 98 101 101
7.4.7	Confirm temperatures in 7.4.6 within 10°F of 7.4.3. (SR 3.3.3.1.1 for 3.3.3.1-1(9.))	B, M, II	1,2,3	C			UNSAT
7.4.8	Calculate the average of operable points in 7.4.6.	M	1,2,3	C			99.1
7.4.9	2H11-P689 - 2T48-R647, Torus Avg Bulk Temp (SR 3.6.2.1.1)	M U	1,2,3	C	All items in 7.4.6 must be operable		95.0 or UNSAT
7.4.10	SPDS Average Torus Water Temperature	M	1,2,3	C	At least nine of 7.4.6 must be operable		98.0
7.4.11	Confirm temperature in 7.4.8 within 2°F of 7.4.9 (SR 3.3.3.1.1 for 3.3.3.1-1(9.))	B,M	1,2,3	C	2T48-R647 must be within 2°F to be operable		UNSAT
7.4.12	Calculate the Torus bulk average temperature $\frac{7.4.3 \ \& \ 7.4.9}{2}$ OR $\frac{7.4.3 \ \& \ 7.4.8}{2}$ if 2T48-R647 is inoperable (SR 3.6.2.1.1)	M	1,2,3	C	≤ 95°F (T.S. ≤ 100°F)		96.05
7.4.13	Confirm temperature in 7.4.12 within 2°F of 7.4.10.	B,M	1,2,3	C			SAT or ✓
					Initials		ARB
	Calculations verified ________ Date________ Time						1215

OPERATOR COPY

UNIT 2

READ AND GIVE A COPY TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 2 is operating at 100 % RTP.
2. 2T48-N303A, Torus Temperature, is out of service and inoperable.
3. 2T48-N308A, Torus Temperature, is out of service and inoperable.
4. 2T48-R647, Torus Bulk Average Temperature, on 2H11-P689 panel is indicating 95.0°F.
5. The Shift Supervisor has directed this surveillance to be completed as a paper version.

INITIATING CUES:

Complete section 7.4 of 34SV-SUV-019-2, SURVEILLANCE CHECKS, which evaluates Torus temperatures,

AND

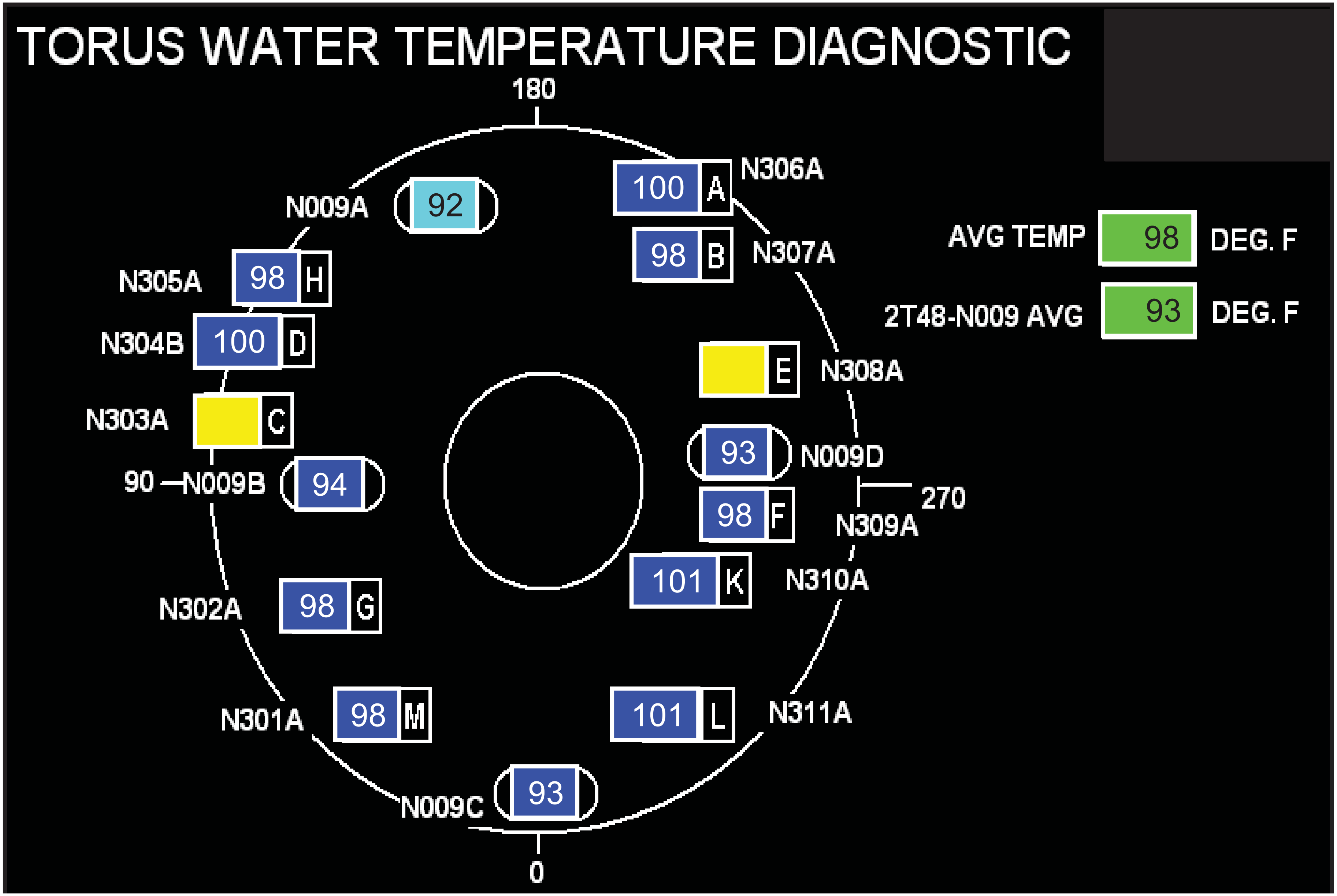
Determine & Inform the evaluator of Bulk Average Torus Temperature

AND

Determine & Inform the evaluator whether LCO 3.6.2.1, Suppression Pool Average Temperature, is / is NOT met.

Attachment 1

Unit 2 SPDS



Attachment 2 (Cont.)

2T47-R626

Attachment 2 (Cont.)

2T47-R627

Southern Nuclear Company

Operations Training
JPM

DRAFT
RO ADMIN 3

Title: INTERPRET STATION ELEMENTARY DRAWINGS		Version: 1.0
Author: Anthony Ball	Media Number: 2019-301 RO ADMIN 3	Time: 25 Minutes
Line Technical Review By (N/A for minor revisions) N/A		Date: N/A
Reviewed by Instructional Technologist or designee: N/A		Date: N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		Date 5/17/2019

SOUTHERN COMPANY

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 RO ADMIN 3

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	05/15/2019	Developed for ILT-12 NRC EXAM 2019-301	ARB	ABG

UNIT 1 ()   UNIT 2 (X)

TASK TITLE:	**INTERPRET STATION ELEMENTARY DRAWINGS**
JPM NUMBER:	**2019-301 RO ADMIN 3**
TASK STANDARD:	The task shall be complete when the Applicant has determined the correct final configuration of the listed RCIC valves due to a failure condition of a relay using Plant Hatch logic drawings.
TASK NUMBER:	100.17
OBJECTIVE NUMBER:	100.017.O

PLANT HATCH JTA IMPORTANCE RATING:

RO

SRO

K/A CATALOG NUMBER: G2.2.15

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.9

SRO 4.3

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 2**
	H-27673, (Ver 41.0) H-27675, (Ver 26.0) H-27676, (Ver 24.0) H-27679, (Ver 22.0)

REQUIRED MATERIALS:	**Unit 2**
	H-27673, (Ver 41.0) H-27675, (Ver 26.0) H-27676, (Ver 24.0) H-27679, (Ver 22.0)

APPROXIMATE COMPLETION TIME: 30.0 Minutes

SETUP: N/A

EVALUATOR COPY

UNIT 2

READ TO THE APPLICANT

INITIAL CONDITIONS:

1. Unit 2 is at 100% power.
2. Relay 2E51-K52A is inoperative and is de-energized.
3. All other plant components are operable.
4. The RCIC logic related drawings are H-27675 and H-27679, which will be provided to you along with H-27673 and H-27676.

INITIATING CUES:

Determine the final configuration of the RCIC System if relay 2E51-K52A failed in the de-energized state.

Prove your answer using plant logic drawings.

The effect on system annunciators is NOT required.

Circle the final configuration of the following RCIC valves:

2E51-F029, Torus Outbd Suction	OPEN	CLOSED
2E51-F031, Torus Inbd Suction	OPEN	CLOSED
2E51-F010, CST Suction	OPEN	CLOSED

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

NOTE: Provide the Applicant with drawings H-27673, H-27675, H-27676, H-27679.

1.	Applicant identifies the contacts associated with relay 2E51-K52A which effect system equipment.	Applicant locates the relay tabulation for 2E51-K52A on plant drawing H 27673.	
2.	Locate on the logic drawing 2E51-K52A contacts for valve 2E51-F031.	On drawing H 27679 the Applicant locates contacts 1-2 in the logic scheme 11, valve 2E51-F031's logic.	
****3.**	Applicant determines the function of 2E51-K52A contacts for valve 2E51-F031.	Determines that upon de-energization of the relay, contacts 1-2 close, sending a signal to 2E51-F031 to **open**.	
4.	Locate on the logic drawing 2E51-K52A contacts for valve 2E51-F029.	On drawing H 27679 the Applicant locates contacts 3-4 in the logic scheme 14, valve 2E51-F029's logic.	
****5.**	Applicant determines the function of 2E51-K52A contacts for valve 2E51-F029.	Determines that upon de-energization of the relay, contacts 3-4 close, sending a signal to 2E51-F029 to **open**.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
6.	Locate 2E51-F010 on the Pump, Valve, and Control Tabulation table on drawing H-27673.	On drawing H 27673 the - applicant determines 2E51-F010's logic circuit is located on drawing H-27679.	
7.	Applicant identifies the relays associated with 2E51-F010.	On drawing H 27679 the - applicant identifies relays 2E51-K2, 2E51-K21 and 2E51-K22.	
8.	Locate relays 2E51-K2, 2E51-K21 and 2E51-K22 on the G.E. Type HFA Relay Tabulation table on drawing H-27673.	On drawing H 27673 the - applicant determines relays 2E51-K2, 2E51-K21 and 2E51-K22 are located on drawings H-27675 and H-27676.	
9.	Applicant determines the function of relay 2E51-K2 for valve 2E51-F010.	On drawing H 27675 the - applicant determines relays 2E51-K2 is part of the start circuit and is NOT initiating an open signal.	
10.	Applicant determines the interface of relays 2E51-K21 and 2E51-F22 for valve 2E51-F010.	On drawing H 27676 the - applicant determines relays 2E51-K21 energizes when 2E51-F029 is open and 2E51-K22 energizes when 2E51-F031 is open.	
****11.**	Applicant determines the results of relays 2E51-K21 and 2E51-F22 energizing for valve 2E51-F010.	On drawing H 27679 the - applicant determines that upon energization relays 2E51-K21 and 2E51-K22 contacts 1-2 close, and contacts 3-4 open sending a signal to 2E51-F010 to **close.**	

END TIME:__________

NOTE: The terminating cue shall be given to the operator when any one of the following is met:

– After JPM step #11 is complete.

– With NO reasonable progress, the Applicant exceeds double the allotted time.

– Applicant states the task is complete.

TERMINATING CUE: We will stop here.
EVALUATOR – PICK UP the Initiating Cue sheet.

(Indicates critical step)**

Summary of JPM Attributes

JPM 2019-301 RO ADMIN 3

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	3

Step 3 Determines contacts 1-2 close	RO identifies that upon de-energization of the relay, a OPEN signal is sent to 2E51-F031 to open.
Step 5 Determines contacts 3-4 close	RO identifies that upon de-energization of the relay, a OPEN signal is sent to 2E51-F029 to open.
Step 11 Determines relays K21 and K22 contacts 1-2 close	RO identifies that upon 2E51-F029 and 2E51-F031 opening, a CLOSE signal is sent to 2E51-F010 to close.

Number of JPM Steps	<30	11
Time to Perform JPM	<45 min	25 min

Normal / Faulted / Alternate Path
Admin (Normal)

Setting (administered)
Classroom

Is LOD "1" or "5"	NO	NO

Answer key

--
--
--
N
Y
--
--
Y
Y

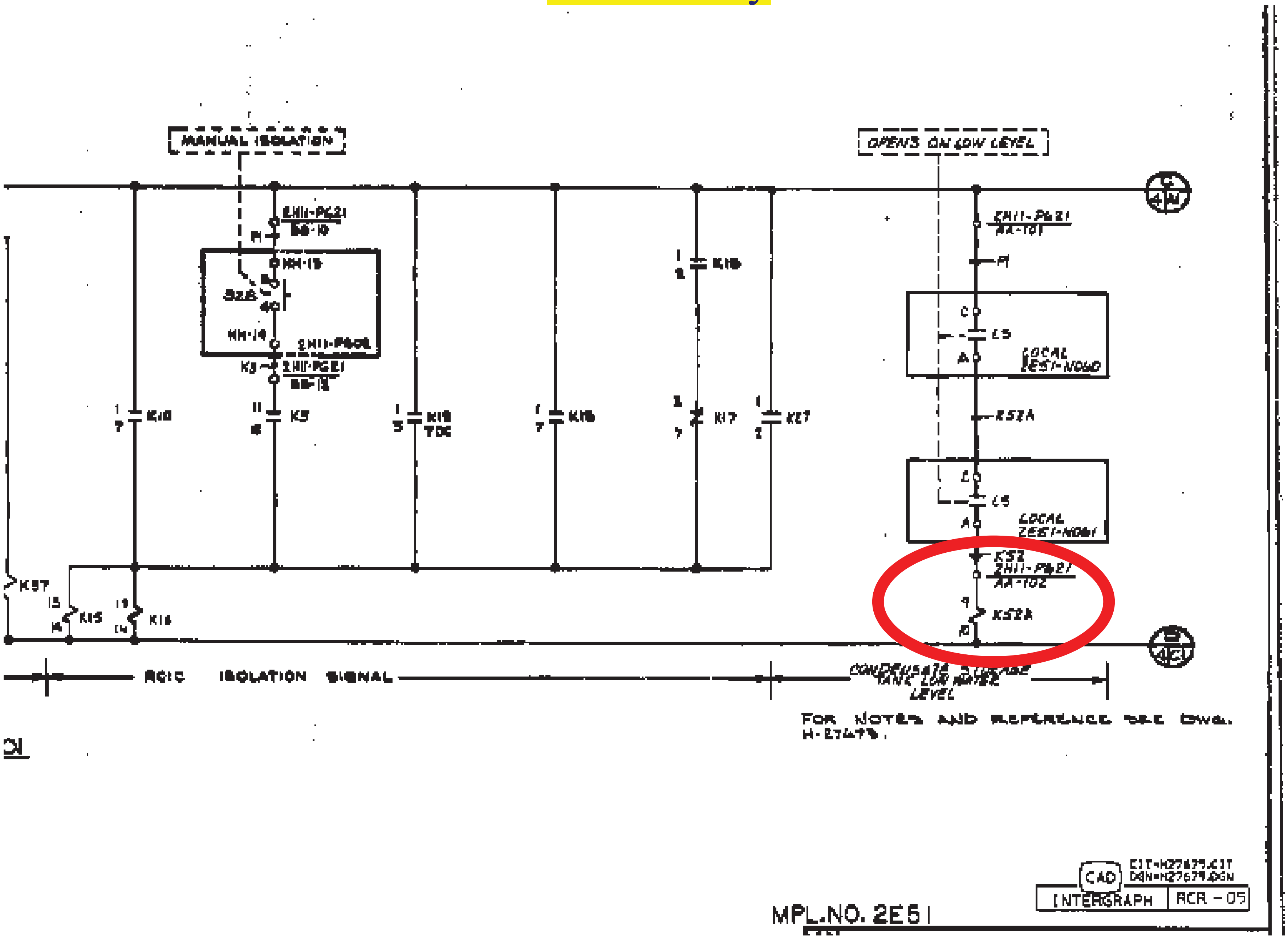
L1 L2	IA1 INST. IA2	IB1 INST IB2	IAT1 TOC IAT2	IBT1 TC
K3 SH3	SPARE	SPARE	ANN SH.6	SPARE

GE TYPE CR120ADC4041AA 125V DC				
9 — 10	1 — 2	3 — 4	5 — 6	7 — 8
2K51A SH.3	2E51-F031 SH.7	2E51-F029 SH.7	ANN SH.6	SPARE
2K52A SH.3	2E51-F031 SH.7 ▲	2E51-F029 SH.7 ▲	ANN ▲ SH.6	SPARE

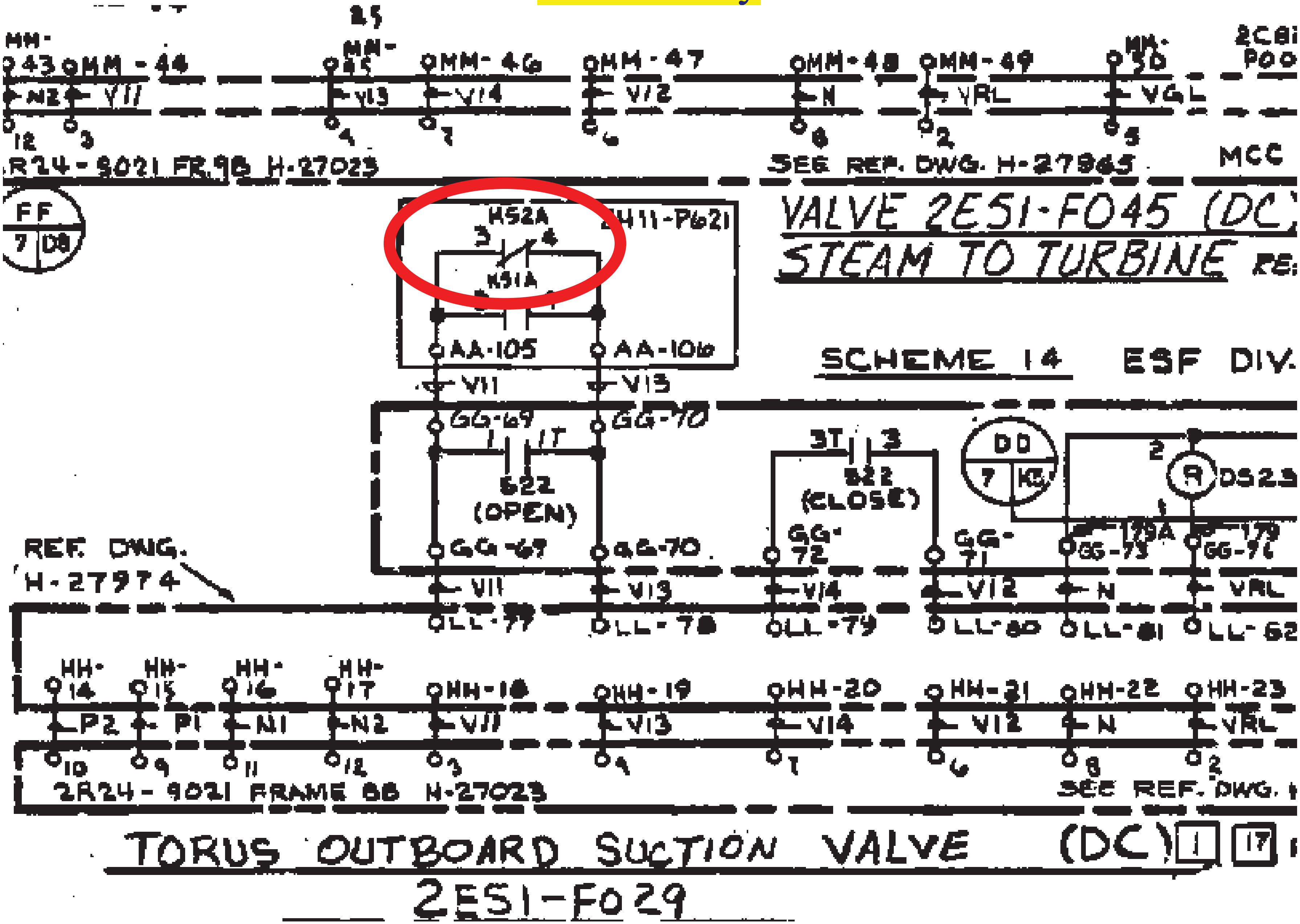
▲ CONTACT TO BE CONVERTED TO NORMALLY CLOSED POSITION

GENERAL ELECTRIC AUXILIARY RELAY 125VDC MODEL NO CR120ADC404AA					
RELAY MPL.NO	9 — 10	1 — 2	3 — 4	5 — 6	7 — 8
2E51A-K56	SH 4 ZONE F7	SPDS/ERF H-24565 ZONE D5	SP	SP	SP

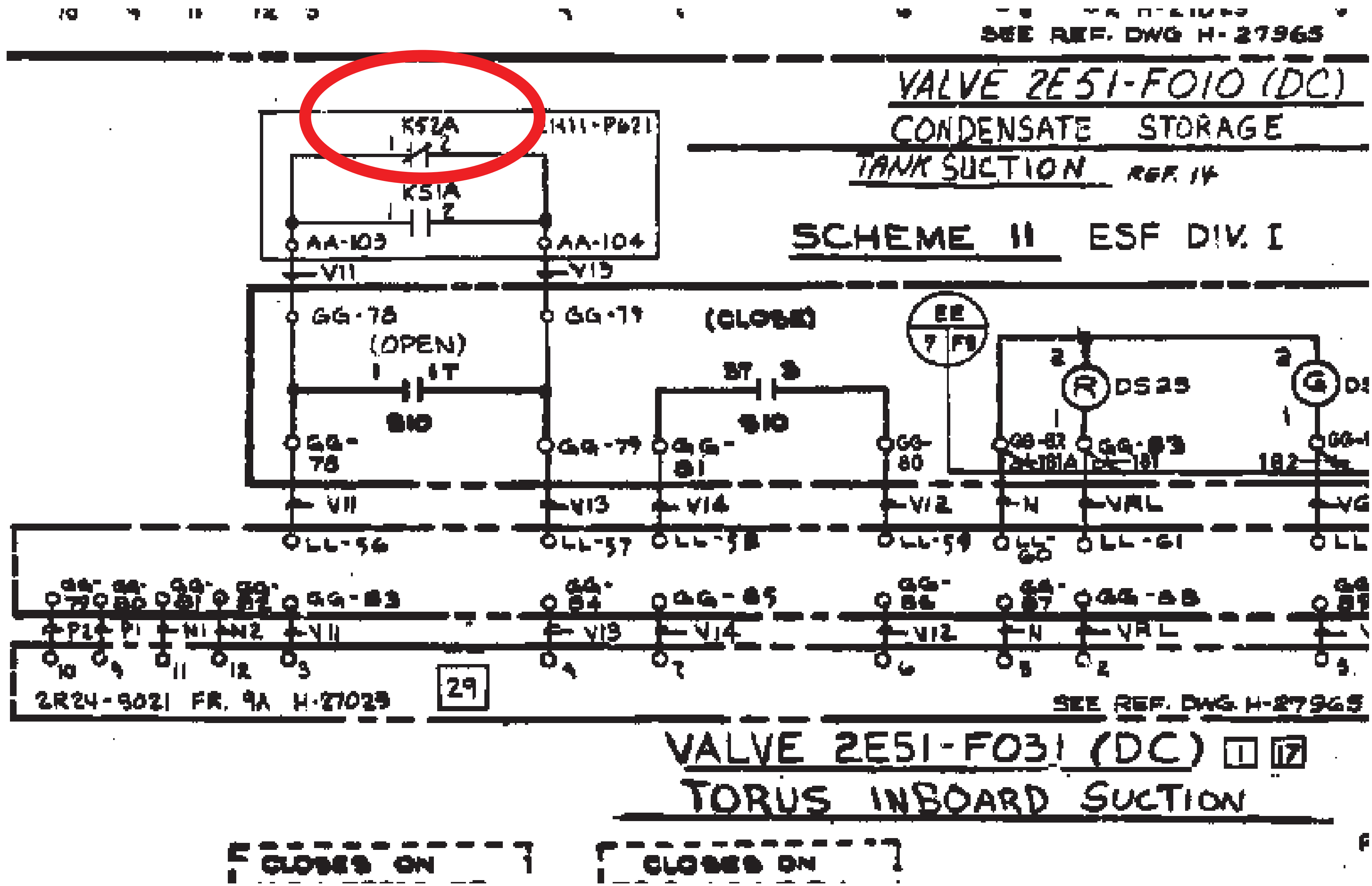
Answer key


MANUAL ISOLATION
OPENS ON LOW LEVEL
2H11-P621 AA-101
LS
LOCAL ZES1-N060
K52A
LOCAL ZES1-N061
K52
2H11-P621 AA-102
K52A
K10
K5
K18 TDC
K16
K17
K27
K57
K15
K18
RCIC ISOLATION SIGNAL
CONDENSATE STORAGE TANK LOW WATER LEVEL
FOR NOTES AND REFERENCE SEE DWG. H-27479.
CAD
INTERGRAPH
RCR - 05
MPL NO. 2E51

Answer key


MCC
R24-9021 FR.9B H-27023
SEE REF. DWG. H-27965
VALVE 2ESI-F045 (DC)
STEAM TO TURBINE
K52A
K51A
H11-P621
AA-105
AA-106
SCHEME 14
ESF DIV.
GG-69
GG-70
S22 (OPEN)
S22 (CLOSE)
DS23
REF. DWG. H-27974
2R24-9021 FRAME 8B H-27023
SEE REF. DWG.
TORUS OUTBOARD SUCTION VALVE (DC)
2ESI-F029

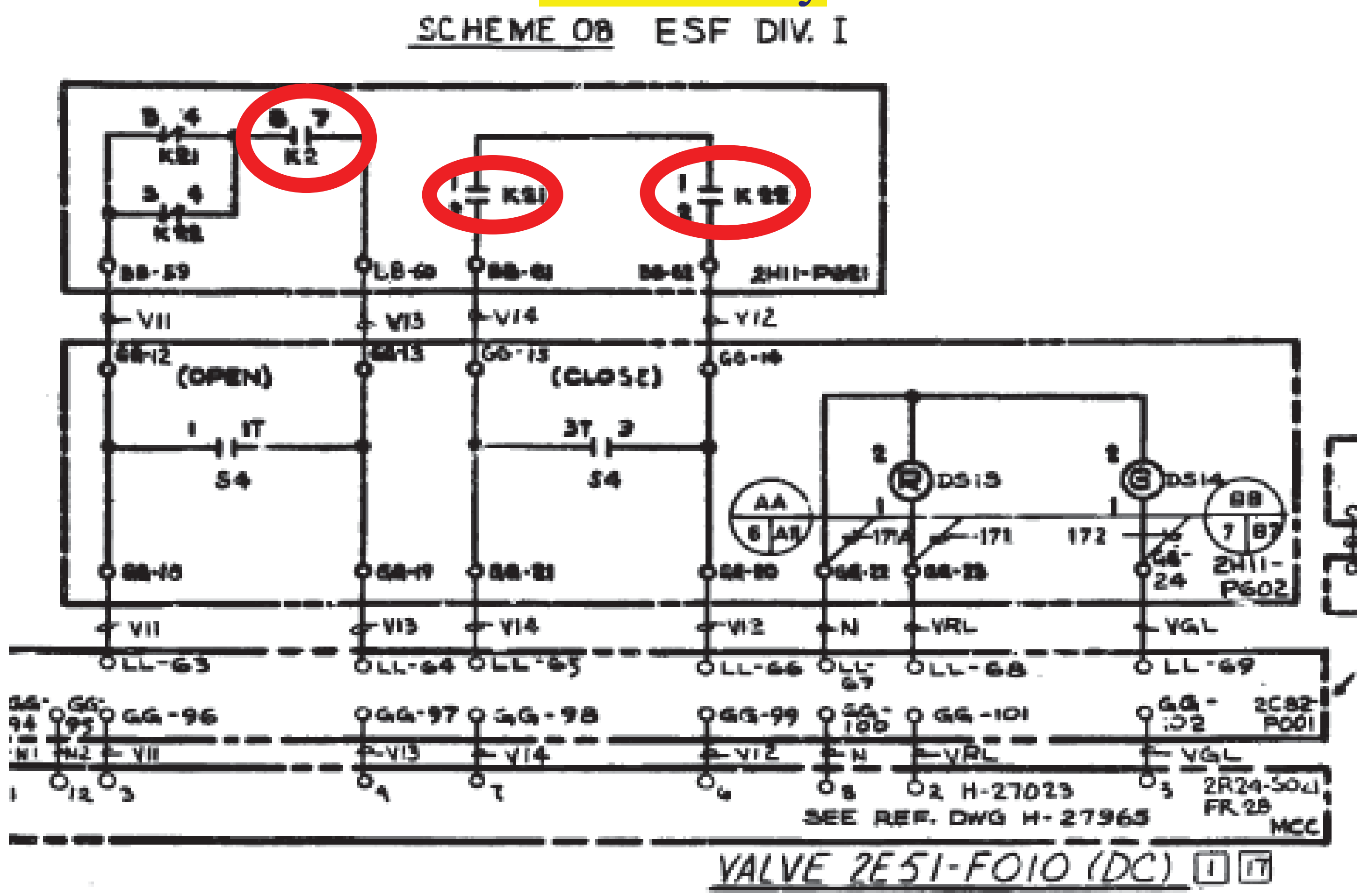
Answer key


SEE REF. DWG H-27965
VALVE 2E51-F010 (DC)
CONDENSATE STORAGE
TANK SUCTION
REF. 14
SCHEME II ESF DIV. I
K52A
K51A
1H11-P621
AA-103
AA-104
V11
V13
GG-78
GG-79
(OPEN)
(CLOSE)
BIO
DS25
GG-80
GG-81
GG-83
V11
V13
V14
V12
N
VRL
LL-56
LL-57
LL-58
LL-59
LL-61
GG-84
GG-85
GG-86
GG-87
GG-88
P21
P1
N1
N2
2R24-S021 FR. 9A H-27025
29
SEE REF. DWG. H-27965
VALVE 2E51-F031 (DC)
TORUS INBOARD SUCTION
CLOSES ON
CLOSES ON

Answer key

PUMP, VALVE AND CONTROL TABULATION							
DEVICE		SWITCH	INDICATOR LAMPS			LOCATION	
REF DESIG	FUNCTION		RED	GREEN	OTHER	MTG LOC	SH
2E51-F007 19	MO VALVE RCIC STEAM SUPPLY ISOL	S1	DS5 DS7	DS6 DS8		2H11-P602 2H11-P601	6
2E51-F008 19	MO VALVE STEAM SUPPLY LINE ISOL	S2	DS9 DS11	DS10 DS12		2H11-P602 2H11-P601	6
2E51-F045	MO VALVE STEAM TO TURBINE	S3	DS27	DS28		2H11-P602	7
2E51-F010 19	MO VALVE, PUMP SUCTION FROM COND STORAGE TANK	S4	DS13	DS14		2H11-P602	7

Answer key

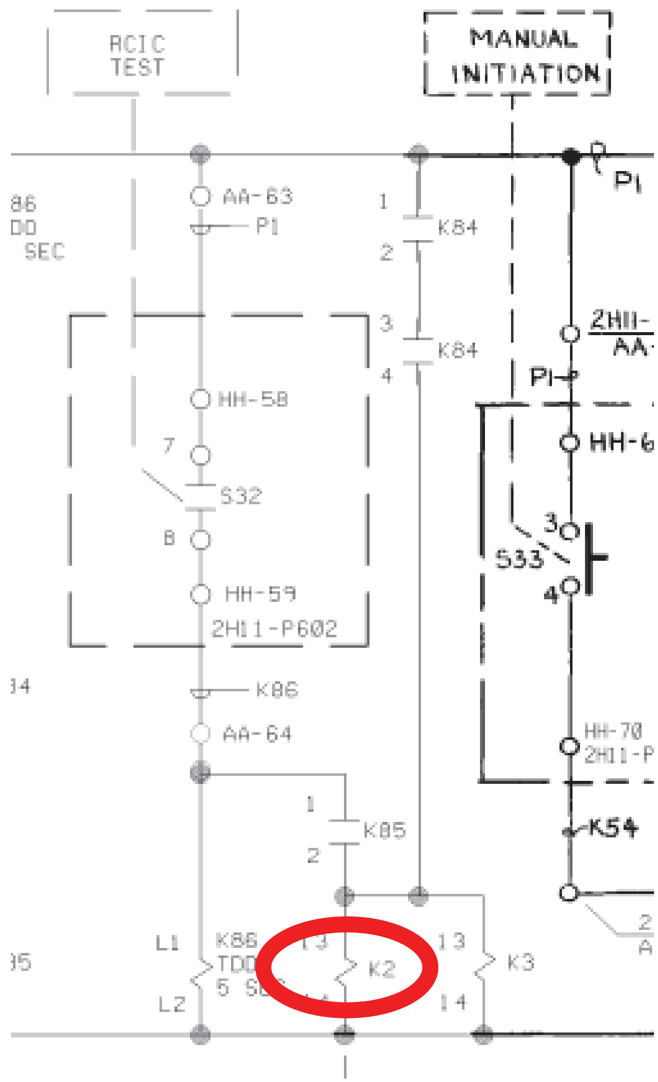

SCHEME 08 ESF DIV. I
K2
(OPEN)
(CLOSE)
2H11-P601
DS13
DS14
2H11-P602
LL-63
LL-64
LL-65
LL-66
LL-68
LL-69
GG-96
GG-97
GG-98
GG-99
GG-101
H-27023
SEE REF. DWG H-27965
2R24-S041
FR 2B
MCC
VALVE 2E51-F010 (DC)

Answer key

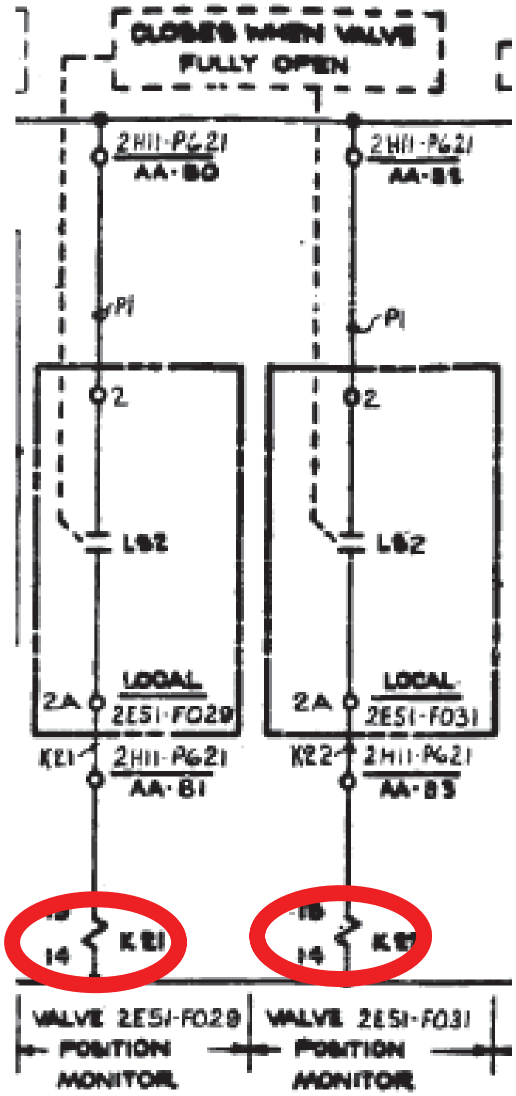
G.E. TYPE HFA RELAY TABULATION

13o—∿—o14	1o—‖—o2	3o—‖—o4	5o—‖—o6
K2 SH. 3	SPARE	2E51-F046 SH. 7	2E51-F013 SH. 7
K3 SH. 3	SPARE	SPARE	2E51-F012 SH. 7
K4 SH. 3	K4 SH. 3	SPARE	DS61 SH. 3
K5 SH. 3	SIG CONV SH. 8 ▲	2E51-R612 SH. 8	SIG CONV SH. 8 ▲
K8 SH. 3	TURB TRIP SH. 8	SPARE	SPARE
K15 SH. 3	K15 SH. 3	SPARE	SPARE
K16 SH. 3	2E51-F008	2E51-F008 ▲	SPDS/ERF H-24565 ZONE D5
* K20 SH. 4	K44 SH. 4 ▲	DS31 SH. 5	SPARE
K21 SH. 4	2E51-F010 SH. 6	2E51-F010 SH. 7 ▲	2E51-F022 SH.9
K22 SH. 4	2E51-F010 SH. 7	2E51-F010 SH. 7 ▲	2E51-F022 SH.9

Answer key

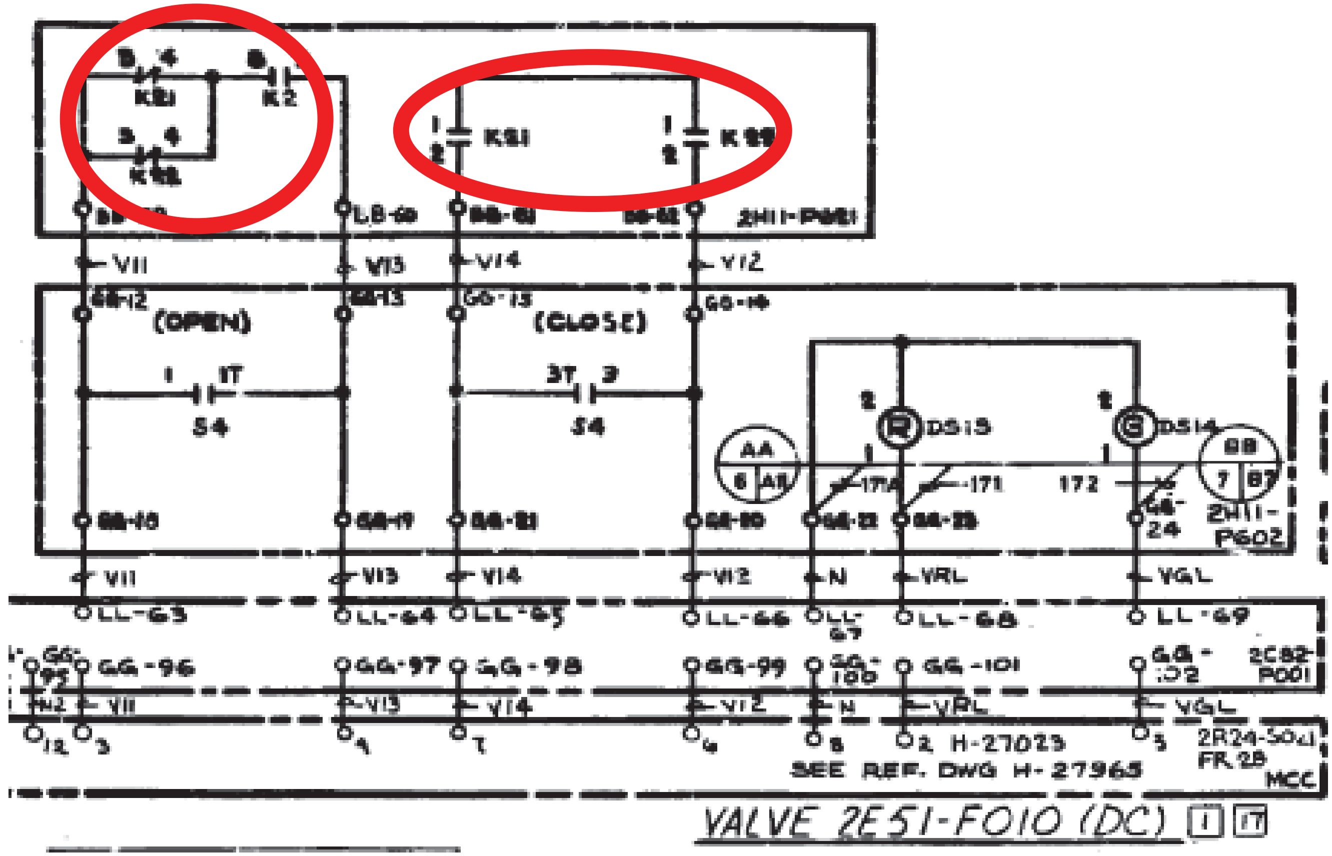

RCIC TEST
MANUAL INITIATION
AA-63
P1
K84
K84
HH-58
S32
HH-59
2H11-P602
K86
AA-64
K85
K86 TDD 5 SEC
L1
L2
K2
13
14
K3
2H11-
AA-
HH-6
S33
HH-70
2H11-P
K54
86
DD
SEC

Answer key


CLOSES WHEN VALVE FULLY OPEN
2H11-P621 AA-B0
2H11-P621 AA-B1
P1
2
LS2
2A
LOCAL 2E51-F029
K21
2H11-P621 AA-B1
LOCAL 2E51-F031
K22
2H11-P621 AA-B3
14
VALVE 2E51-F029 POSITION MONITOR
VALVE 2E51-F031 POSITION MONITOR

Answer key

SCHEME 08 ESF DIV. I



ANSWER KEY

2E51-F029, Torus Outbd Suction	OPEN	CLOSED
2E51-F031, Torus Inbd Suction	OPEN	CLOSED
2E51-F010, CST Suction	OPEN	CLOSED

UNIT 2

READ TO THE APPLICANT

INITIAL CONDITIONS:

1. Unit 2 is at 100% power.
2. Relay 2E51-K52A is inoperative and is de-energized.
3. All other plant components are operable.
4. The RCIC logic related drawings are H-27675 and H-27679, which will be provided to you along with H-27673 and H-27676.

INITIATING CUES:

Determine the final configuration of the RCIC System if relay 2E51-K52A failed in the de-energized state.

Prove your answer using plant logic drawings.

The effect on system annunciators is NOT required.

Circle the final configuration of the following RCIC valves:

2E51-F029, Torus Outbd Suction	OPEN	CLOSED
2E51-F031, Torus Inbd Suction	OPEN	CLOSED
2E51-F010, CST Suction	OPEN	CLOSED

Southern Nuclear Company

Operations Training
JPM

DRAFT
RO ADMIN 4 – RO

Title:		Ver.
DETERMINE THE EVACUATION ROUTE DURING AN EMERGENCY		1.0
Author: **Anthony Ball**	**Media Number:** 2019-301 RO ADMIN 4	**Time:** 10 Minutes
Line Technical Review By (N/A for minor revisions **N/A**		**Date:** **N/A**
Reviewed by Instructional Technologist or designee: **N/A**		**Date:** **N/A**
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmunds**		**Date:** **5/16/2019**

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 RO ADMIN 4

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/16/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	**DETERMINE THE EVACUATION ROUTE DURING AN EMERGENCY**
JPM NUMBER:	**2019-301 RO ADMIN 4**
TASK STANDARD:	The task shall be satisfactorily completed when the wind direction has been checked and the operator has determined the correct exit point, site exit route and evacuation route IAW NMP-EP-144 to evacuate via Gate 17, then using the MAIN ACCESS ROAD and then NORTH on US Highway 1.
TASK NUMBER:	200.059
OBJECTIVE NUMBER:	200.059.A

PLANT HATCH JTA IMPORTANCE RATING:

RO 3.86

SRO 3.96

K/A CATALOG NUMBER: G2.4.39

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.9

SRO 3.8

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	**Unit 1 & 2**
	NMP-EP-144 (Ver. 4.0)

REQUIRED MATERIALS:	**Unit 1 & 2**
	NMP-EP-144 (Ver. 4.0)

APPROXIMATE COMPLETION TIME: 10 Minutes

SIMULATOR SETUP: N/A

EVALUATOR COPY

UNIT 1 & 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. The Prompt Off-Site Does Assessment indicated an offsite release is in progress from the Main Stack.
2. The Emergency Director (ED) has declared a Site Area Emergency.
3. The ED has directed a PA announcement to be performed IAW NMP-EP-142.
4. SPDS Meteorological Data is provided as an attachment.
5. All normal Exit points and site exit routes are available for selection.

INITIATING CUES:

In preparation of making a page announcement for the above emergency condition,

- **DETERMINE** the applicable:
  - Exit point,
  - Exit route, and
  - Evacuation route IAW NMP-EP-144, Protective Actions, and
- **INFORM** the ED of the results.

NOTE: Another Operator will make the actual page announcement.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences. Reference: NMP-TR-111, "On-The-Job Training and Task Performance Evaluation".

START TIME:__________

NOTE: The Operator may review NMP-EP-142-F10 "Site Area Emergency Public Address Announcement Script".

1.	Select correct section of NMP-EP-144.	The Operator uses NMP-EP-144 Table of Contents and determines that Instruction 4.1.6 – Site Evacuation With Radiological Monitoring, is the required section.	
2.	Operator must determine which attachment is required to be performed to correctly identify the evacuation routes. (step 4.1.6.1.a)	Operator determines that NMP-EP-144 Attachment 11, Hatch Site Evacuation Routes, is required to be performed.	
3.	Is a radiological release in progress? (Att. 11, step 1)	Operator reviews Initial Conditions and determines "YES" and goes to Att. 11 step 1. B.	

NOTE: If the operator marks "NO", the wrong Evacuation Route and State Reception Center (s) will be determined.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: Att. 11 NOTE after Step 1.b informs the operator to use the 15-minute average wind direction information using the meteorological instrumentation that corresponds to the primary release point:
The 100M instrument must be used for Main Stack (elevated) release.
The 10M instrument must be used for RB Vent (ground) release.

NOTE: The Operator will determine the 100M wind direction is required to be used (Main Stack) due to the MIDAS handout indicating the Unit 1 Rx bldg. and Unit 2 Rx bldg. stacks Normal range rad monitors being in service and the Main Stack 1D11-R631 accident range monitor (KAMAN system) being in service with the normal range out of service. This indicates a release out of the Main Stack which is considered an Elevated release.

**4.	The operator must determine if the 10M or 100M meteorological instruments will be used to determine meteorological conditions. (Att. 11, step 1.b)	From the SPDS MIDAS screen, the Operator determines that the **100M** instruments will be used.	
****5.**	IF a radiological release is in progress, THEN, based on wind direction, determine *************** (Att. 11 table)	At a SPDS terminal, determines 100M wind direction is **55 degrees** using either: SPDS MIDAS screen OR SPDS MET Data screen	

****6.**	*************** the Exit point, *************** (Att. 11 table)	Determines the Exit Point is the Gate 17.	

NOTE: If the operator uses the 10 Meter wind direction, the Exit Point will (INCORRECTLY) be PESB.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**7.	*************** site exit route, *************** (Att. 11 table)	Determines the Site Exit Route is the Main Access Road.	

NOTE: If the operator uses the 10 Meter wind direction, the Site Exit Route will (INCORRECTLY) be the Road behind Low Level Radwaste Building.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**8.	*************** Evacuation route/State Reception Center (Att. 11 table)	Determines the Evacuation Route is U.S. Hwy. 1 - North to Toombs Co. Middle School/ Lyons.	

NOTE: If the operator uses the 10 Meter wind direction, the evacuation route will (INCORRECTLY) state "U.S. Hwy 1 – South to Appling Co. High School/Baxley".

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
9.	The Operator informs the ED of the applicable Exit point, exit route, and evacuation route	The Operator informs the ED of the following: Exit Point: Gate 17 Exit Route: Main Access Road Evacuation Route/Reception Center: U.S. Hwy. 1 - North to Toombs Co. Middle School/ Lyons	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

NOTE: If the operator uses the 10 Meter, 23 Meter or the 60 Meter wind direction, the Site Exit Route will (INCORRECTLY) state "Road behind LLRWB".

PROMPT: **IF** the operator addresses Page Announcements, as the Shift Supervisor, **INFORM** the operator that will performed by another Operator.

END TIME:__________

NOTE: The terminating cue shall be given to the Operator when:

- After JPM step #9 is complete.
- With NO reasonable progress, the Operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM 2019-301 RO ADMIN 4:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	5

Step 4 Determines Elevated Release — Determines an Elevated release and that the 100M instruments will be used or the wrong Evacuation Route and State Reception Centers will be determined causing undue exposure to evacuees.

Step 5 Wind Direction — Improper wind direction of 65 degrees using the 10 Meter vice the 100 Meter reading of 55 degrees (correct wind direction) will cause the wrong Evacuation Route and State Reception Centers to be determined causing undue exposure to evacuees.

Step 6 Exit Point — Using the Table and selecting the correct Exit Point will prevent undue exposure to evacuees.

Step 7 Site Exit Route — Using the Table and selecting the correct Site Exit Route will prevent undue exposure to evacuees.

Step 8 Evacuation Route — Using the Table and selecting the correct Evacuation Route will prevent undue exposure to evacuees.

Number of JPM Steps	<30	9
Time to Perform JPM	<45 min	10 min

Normal / Faulted / Alternate Path

Admin (Normal) — Determine Exit Point, Site Exit Route and Evacuation Route during an Emergency with a Release.

Setting (administered)

Anywhere reference material is available

Is LOD "1" or "5"	NO	NO

MIDAS INFORMATION

METEOROLOGICAL

10M WIND SPD 133-R601 5.0	100M WIND SPD 1Y33-R603 4.0	10M WIND DIR 1Y33-R601 65	100M WIND DIR 1Y33-R603 55
AMBIENT TMP (F) 10M 55	DELTA T 60-10 -0.5	DELTA T 100-10 -1.0	RAINFALL 15 MIN AVG .000

RADIOLOGICAL

MAIN STACK		U1 RX BLDG VENT		U2 RX BLDG VENT	
NORMAL RANGE 1D11-K600A	KAMAN 1D11-R631 8.65E+02	NORMAL RANGE 1D11-K619A 6.70E+01	KAMAN 1D11-R631	NORMAL RANGE 2D11-K636A 5.60E+01	KAMAN 2D11-R631
1D11-K600B		1D11-K19B 6.67E+01		2D11-K636B 5.56E+01	

STABILITY
CLASS
D

METEOROLOGICAL DATA

Wind	(DIRECTION FROM)	15 MIN AVERAGE	STD-DEV	SPEED	15 MIN AVERAGE
10M ELEVATION	65 DEG	65 DEG	12	1 MPH	0 MPH
60M ELEVATION	63 DEG	63 DEG	6	2 MPH	2 MPH
100M ELEVATION	55 DEG	55 DEG	4	4 MPH	4 MPH
45M ELEVATION-BACKUP	50 DEG	50 DEG	4	2 MPH	2 MPH

TEMPERATURE			15 MIN AVERAGE
10M ELEVATION AMBIENT	55 DEG F	FLOW*	
10M ELEVATION AMBIENT-BACKUP	55 DEG F	FLOW	
10M DEWPOINT	73 DEG F		
60M - 10M DELTA TEMP.	-0.5 DEG F	FLOW	-4.1 DEG F
100M - 10M DELTA TEMP.	-1.0 DEG F	FLOW	-2.4 DEG F
45M - 10M DELTA TEMP.-Backup	-1.0 DEG F	FLOW	-2.4 DEG F

Precipitation .00 INCHES SINCE MIDNIGHT

EVALUATOR ANSWER KEY

HATCH SITE EVACUATION ROUTES

1. Is a radiological release in progress? Yes No

   a. IF a radiological release is NOT in progress, **use** the following exit point, site exit route, and evacuation route.

   - Exit Point - Plant Entry & Security Building (PESB)
   - Site Exit Route - Main Access Road
   - Evacuation Route - Either direction on U.S. Hwy. 1

   b. IF a radiological release is in progress, THEN, based on wind direction, **determine** the rally point, site exit route, evacuation route, and State Reception Center with the chart below.

NOTE

- Security should be consulted to determine alternative(s) IF designated exit point and/or site exit route cannot be used. Using an alternate exit point requires discussion with Security and RP.
- The 15 minute average wind direction information must be read using the meteorological instrumentation that corresponds to the primary release point:
  - The 100M instrument must be used for Main Stack (elevated) release.
  - The 10M instrument must be used for RB Vent (ground) release.
  - Consult the On-Shift Dose Analyst or the EOF Dose Assessment Staff for alternate locations IF either of these instruments are INOPERABLE.

Wind Direction From	Exit Point	Site Exit Route	Evacuation Route/ State Reception Center
340º - 60º **(55º)**	Gate 17	Main Access Road	U.S. Hwy. 1 - North to Toombs Co. Middle School/ Lyons
61º - 110º	PESB	Road behind LLRWB	U.S. Hwy. 1 - South to Appling Co. High School/ Baxley
111º - 225º	PESB	Main Access Road	U.S. Hwy. 1 - South to Appling Co. High School/ Baxley
226º - 339º	PESB	Main Access Road	EITHER direction on U.S. Hwy. 1 to Toombs Co. Middle School/ Lyons OR Appling Co. High School/ Baxley

UNIT 1 & 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. The Prompt Off-Site Does Assessment indicated an offsite release is in progress from the Main Stack.
2. The Emergency Director (ED) has declared a Site Area Emergency.
3. The ED has directed a PA announcement to be performed IAW NMP-EP-142.
4. SPDS Meteorological Data is provided as an attachment.
5. All normal Exit points and site exit routes are available for selection.

INITIATING CUES:

In preparation of making a page announcement for the above emergency condition,

- **DETERMINE** the applicable:
  - Exit point,
  - Exit route, and
  - Evacuation route IAW NMP-EP-144, Protective Actions, and
- **INFORM** the ED of the results.

NOTE: Another Operator will make the actual page announcement.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
SRO ADMIN 1

Title: TRM/TS Evaluation Of Failed RWL Instruments		**Version:** 1.0
Author: Anthony Ball	**Media Number:** 2019-301 SRO ADMIN 1	**Time:** 15 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date:** 5/15/2019

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 SRO ADMIN 1

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 (X) UNIT 2 ( )

TASK TITLE:	**TRM/TS Evaluation Of Failed RWL Instruments**
JPM NUMBER:	2019-301 SRO ADMIN 1
TASK STANDARD:	For a SRO to successfully complete this task the SRO has determined using the TRM & Tech Specs that Required Action 3.3.5.3.B.2 is required to be performed within 24 hours by placing a channel in trip and that TS Required Action 3.3.5.3.B.1 is required to be performed.
TASK NUMBER:	OPSR300.027
OBJECTIVE NUMBER:	H-OP300.027A

PLANT HATCH JTA IMPORTANCE RATING:

RO N/A

SRO N/A

K/A CATALOG NUMBER: G2.1.7

K/A CATALOG JTA IMPORTANCE RATING:

RO NA

SRO 4.7

OPERATOR APPLICABILITY: Senior Reactor Operator (SRO)

GENERAL REFERENCES:	**Unit 1**
	UNIT 1 TECH SPECS UNIT 1 TRM
REQUIRED MATERIALS:	**Unit 1**
	UNIT 1 TECH SPECS UNIT 1 TRM

APPROXIMATE COMPLETION TIME: 15 Minutes

SIMULATOR SETUP: NOT Applicable

EVALUATOR COPY

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. 1B21-N091A instrument detector has failed causing 1B21-R604A, Wide Range Instrument, to indicate High Upscale.
2. 1B21-N691B, Master Trip Unit **(MTU)**, has failed and will NOT provide a trip signal.

INITIATING CUES:

Determine Technical Specification required actions with regards to RCIC ONLY.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

1.	Operator identifies the procedure needed to perform the task.	Operator has identified the correct procedure as Unit 1 TRM/TS.	
2.	Determines the correct LFD by using section Table T10.1-1 Master Equipment Cross Reference-Sorted by MPL of the TRM.	Determines the correct LFD to be LFD-1-RCIC-01 by referencing 1B21-N691 A, B, C, D. (1B21-N091A and 1B21-N691B both reference LFD-1-RCIC-01)	
3.	Determines correct Technical Specifications section to be entered by using section Table T10.1-1 Master Equipment Cross Reference-Sorted by MPL of the TRM.	Determines Technical Specification section to be referenced by TRM section Table T10.1-1 Master Equipment Cross Reference is TS 3.3.5.3-1(1.)	
****4.**	Determines if RCIC Initiation is being maintained by using LFD.	Determines that 1E11-K79A contact (Channel A1) will NOT close since the instrument has failed high as given in the Initiating Cue.	

NOTE: Contact 1E11-K79A will only close on RWL Low Level 2 (-35 inches).

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**5.	Determines if RCIC Initiation is being maintained by using LFD.	Determines that 1E11-K79B (Channel B1) contact will NOT close since the MTU will NOT trip as given in the Initiating Cue.	
**6.	Determines if RCIC Initiation is being maintained by using LFD.	Determines that RCIC Initiation is NOT being maintained since relay E51-K2, K3, K81, K85 can NOT be energized by using drawing for the TRIP Logic or by using the Minimum Channel Requirements for System Initiation Capability at bottom of LFD.	

NOTE: Minimum Channel Requirements for System Initiation Capability:
A1 & A2
A1 & B2
B1 & A2
B1 & B2

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
7.	Determines Technical Specification Required Actions	SRO determines that TS Table 3.3.5.3-1(1.) requires 4 channels to be operable AND SRO determines 2 of the 4 required Channels (A1 and B1) are INOP.	
**8.	Determines Technical Specification Required Actions	SRO enters TS 3.3.5.3.A and performs Required Action A.1 Immediately by Entering Condition referenced in Table 3.3.5.3-1 for the channel. The SRO immediately enters Condition 3.3.5.3.B	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**9.	Determines Technical Specification Required Actions	SRO determines Required Action B.1 is required to be performed since RCIC Initiation Capability is NOT maintained and will declare RCIC inoperable within one hour.	
**10.	Determines Technical Specification Required Actions	SRO performs Required Action B.2 by directing Channel placed in trip within 24 hours	

END TIME: __________

NOTE: The terminating cue shall be given to the Operator when:

- When the operator completes step 10.
- With NO reasonable progress, the Operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: That completes this JPM.

EVALUATOR – **PICK UP** the Initiating Cue sheets **AND** Attachments 1 & 2.

Summary of JPM Attributes

JPM 2019-301 SRO ADMIN 1**:**

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	6
Step 4 Determines Ch A1 will not trip		Loss of one of four required channels
Step 5 Determines Ch B1 will not trip		Loss of second of four required channels.
Step 6 Initiation not maintained		Loss of function.
Step 8 Enters TS 3.3.5.3.A		Action required for loss of one or more channel
Step 9 Determine action B1 required		Declares RCIC Inoperable
Step 10 Determine action B2 required		Places channel in trip.
Number of JPM Steps	<30	10
Time to Perform JPM	<45 min	15 min
Normal / Faulted / Alternate Path		
Normal		
Setting (administered)		
Simulator		
Is LOD "1" or "5"	NO	NO

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. 1B21-N091A instrument detector has failed causing 1B21-R604A, Wide Range Instrument, to indicate High Upscale.

2. 1B21-N691B, Master Trip Unit **(MTU)**, has failed and will NOT provide a trip signal.

INITIATING CUES:

Determine Technical Specification required actions with regards to RCIC ONLY.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
SRO ADMIN 2

Title: DETERMINE IF THE REACTOR MODE SWITCH CAN BE TRANSFERRED FROM STARTUP/HOT STANDBY TO RUN		**Version:** 1.0
Author: Anthony Ball	**Media Number:** 2019-301 SRO ADMIN 2	**Time:** 20 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date** 5/17/2019

SOUTHERN COMPANY
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Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 SRO Admin 2

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	DETERMINE IF THE REACTOR MODE SWITCH CAN BE TRANSFERRED FROM STARTUP/HOT STANDBY TO RUN
JPM NUMBER:	2019-301 SRO Admin 2
TASK STANDARD:	The task shall be complete when it has been determined that the requirements of 34GO-OPS-001-2, "Plant Startup" and Technical Specifications have been met and the Reactor Mode Switch CAN be placed in RUN following performance of a risk assessment.
TASK NUMBER:	010.019
OBJECTIVE NUMBER:	010.019.J

PLANT HATCH JTA IMPORTANCE RATING:

RO N/A

SRO 3.42

K/A CATALOG NUMBER: G2.1.23

K/A CATALOG JTA IMPORTANCE RATING:

RO N/A

SRO 4.4

OPERATOR APPLICABILITY: SRO only

GENERAL REFERENCES:	**Unit 2**
	34GO-OPS-001-2 (51.3) Unit 2 Technical Specifications Unit 2 Technical Requirements Manual

REQUIRED MATERIALS:	**Unit 2**
	34GO-OPS-001-2 (51.3) Unit 2 Technical Specifications Unit 2 Technical Requirements Manual

APPROXIMATE COMPLETION TIME: 20 Minutes

SIMULATOR SETUP: N/A

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A plant startup is in progress. Operators have completed up to step 7.4.12.3 of 34GO-OPS-001-2, "Plant Startup" and are awaiting approval to place the Reactor Mode Switch to "RUN".

2. Main Control Room Air Conditioning units 1Z41-B003A and 1Z41-B003C are in service. 1Z41-B003B is in standby.

3. It has just been reported that one of the Main Control Room Air Conditioning units (1Z41-B003A) has a significant refrigerant leak with very little refrigerant remaining in the unit.
   - 1R24-S029 is aligned to 1R24-S002.

4. Main control air temperature is currently at 79°F and slowly rising.

5. Outside air temperature is 80° F.

6. No other Required Action Statements (RAS's) are in effect.

INITIATING CUES:

Evaluate plant and equipment status. Then IAW Technical Specification requirements and allowances determine if the Reactor Mode Switch can be placed in "RUN."

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

PROMPT: The candidate should determine that "A" MCREC Air Handling Unit is Inoperable. **IF** the candidate addresses writing a RAS, **INFORM** the operator that another SRO will write the RAS.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
****1.**	The operator determines that 1Z41-B003A is inoperable.	The operator determines 1Z41-B003A is INOPERABLE. Due to a refrigerant leak and. rising Control Room temperature.	
2.	Operator addresses Technical Specifications for Control Room Air conditioning.	The operator REVIEWS Tech Spec 3.7.5. and determines Three control room AC subsystems are required to be OPERABLE in MODEs 1, 2, and 3.	
****3.**	Operator reviews TRM table T2.1-1	The operator DETERMINES that both MCREC subsystem are OPERABLE.	
****4.**	Operator reviews TRM table T2.1-1	The operator DETERMINES that the "B" and "C" Control Room Air Conditioners are OPERABLE.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**5	Operator determines that the Mode Switch **can** be placed in RUN.	IAW TS 3.7.5 and TS 3.0.4.b, the operator DETERMINES that the Reactor Mode Switch CAN be placed in RUN following the performance of a risk assessment.	

END TIME:__________

NOTE: The terminating cue shall be given to the operator when:

- With no reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM 2019-301 SRO Admin 2:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	4

Step 1 Determine 1Z41-B003A INOP	Enters TS 3.7.5 on one required MCR Air Handler INOP.
Step 3 Determine MCREC OPERABLE	Allows Mode shift
Step 4 Determine Air Conditioners OPERABLE	Allows Mode shift
Step 5 Determine MS can be placed in RUN	If a risk assement is done allows Mode shift.

Number of JPM Steps	<30	5
Time to Perform JPM	<45 min	20 min

Normal / Faulted / Alternate Path

Normal

Setting (administered)

Classroom

Is LOD "1" or "5"	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. A plant startup is in progress. Operators have completed up to step 7.4.12.3 of 34GO-OPS-001-2, “Plant Startup” and are awaiting approval to place the Reactor Mode Switch to “RUN”.

2. Main Control Room Air Conditioning units 1Z41-B003A and 1Z41-B003C are in service. 1Z41-B003B is in standby.

3. It has just been reported that one of the Main Control Room Air Conditioning units (1Z41-B003A) has a significant refrigerant leak with very little refrigerant remaining in the unit.
   - 1R24-S029 is aligned to 1R24-S002.

4. Main control air temperature is currently at 79°F and slowly rising.

5. Outside air temperature is 80° F.

6. No other Required Action Statements (RAS’s) are in effect.

INITIATING CUES:

Evaluate plant and equipment status. Then IAW Technical Specification requirements and allowances determine if the Reactor Mode Switch can be placed in “RUN.”

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
SRO ADMIN 3

TITLE **Initiate a RAS for Inoperable Component**		**Version:** 1.0
Author: Arthur Genereux	**Media Number:** 2019-301 SRO Admin 3	**Time:** 30 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date** 5/15/2019

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 SRO ADMIN 3

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 ( ) UNIT 2 (X)

TASK TITLE:	Initiate a RAS for Inoperable Component
JPM NUMBER:	2019-301 SRO Admin 3
TASK STANDARD:	The task shall be completed when the operator has correctly completed Sections 1 thru 5 of Required Action Sheet, Form 1349.
TASK NUMBER:	OPSR300.027
OBJECTIVE NUMBER:	H-OP300.027A

PLANT HATCH JTA IMPORTANCE RATING:

RO N/A

SRO N/A

K/A CATALOG NUMBER: G2.2.23

K/A CATALOG JTA IMPORTANCE RATING:

RO NA

SRO 4.6

OPERATOR APPLICABILITY: Senior Reactor Operator (SRO)

GENERAL REFERENCES:	**Unit 1**
	31GO-OPS-006, Conditions, Required Actions and Completion Times (Ver 8.5) OPS-1349, Required Action Sheet (Ver 3.0) TECH SPECS UNIT 1
REQUIRED MATERIALS:	**Unit 1**
	UNIT 1 TECH SPECS 31GO-OPS-006-0 Conditions, Required Actions and Completion Times (Ver 8.5) OPS-1349, Required Action Sheet (Ver 3.0) Inop Status Indicator Picture 2019 Calendar

APPROXIMATE COMPLETION TIME: 30 Minutes

SIMULATOR SETUP: NOT Applicable

EVALUATOR COPY

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 1 is operating at 100% RTP.
2. At 0600 on 8/1/19 1P41-F310A, Turbine Building Isolation Valve, is declared inoperable due to a failed breaker.
3. The last Required Action Sheet Number listed in the Required Action Tracking Log is 1-19-69
4. All other equipment is operable.
5. Protected Equipment signs have been posted IAW NMP-OS-010, Protected Train/Division and Protected Equipment Program.
6. Shift Manager is out of the control room and will review the RAS at a later time.

INITIATING CUES:

Complete the Required Action Sheet, form OPS-1349, for Unit 1 1P41-F310A, Turbine Building Isolaton Valve.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME:__________

PROMPT: **PROVIDE** the following to the operator:

- **31GO-OPS-006-0,** Conditions, Required Actions, And Completion Times
- OPS-1349, Required Action
- Attachment 2, INOP Status Indicating Light
- Attachment **3,** Calendar

1.	Operator obtains the procedure needed to perform the task.	Operator has obtained 31GO-OPS-006-0, Conditions, Required Actions, And Completion Times & Unit 1 Tech Specs.	

****2.**	Assigns a RAS number from the Required Action Tracking Log. (step 4.1.1.a)	The operator records RAS #**1-19-070**	
3.	Locates the appropriate Tech Spec section (LCO 3.7.2).	Addresses Unit 1 Tech Spec section 3.7.2 Action B.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**4.	Enters the MPL number in the "MPL" block of section 1 of the RAS form. (step 4.1.1.b)	The operator enters **"1P41-F310A"**	
5.	Enters the Description in the "Description" block of section 1 of the RAS form. (step 4.1.1.b)	The operator enters **"Turbine Bldg. Isolation Valve"**	
**6.	Enters the time and date the valve became inoperable in the "Inoperable time/date" block of section 1 of the RAS form. (step 4.1.1.c)	The operator enters **"0600 & 08/01/19"**	
7.	Evaluates the RAS section 1 "Return to Oper Time/Date" block. (step 4.1.1.r)	The operator determines the block is left blank. (**Blank**)	
8.	Evaluates the RAS section 1 "Init" block. (step 4.1.1.r)	The operator determines the block is left blank. (**Blank**)	
**9.	Enters the time and date the valve became inoperable in the "Initiation Time/Date" block of section 2 the RAS form. (step 4.1.1.f)	The operator enters **"0600 & 08/01/19"**	
**10.	Enters the required restoration time and date in "Req Restoration" Time/Date" block of section 2 of the RAS form. (step 4.1.1.g)	The operator enters **"0600 & 8/31/19"**.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
11.	Evaluates the RAS section 2 "Modified Completion Time/Date" block. (step 4.1.1.h)	The operator enters **N/A** or leaves **Blank.**	
12.	Evaluates the RAS section 2 "Extended Completion Time/Date/Init" block. (step 4.5.1)	The operator enters **N/A** or leaves **Blank.**	
13.	Evaluates the RAS section 2 "SFDP Entered" block. (step 4.1.1.i)	The operator marks **N/A**	
14.	Evaluates the RAS section 2 "INOP Status Indic Lit" block. (step 4.1.1.j)	The operator marks **YES**	
15.	Evalautes the RAS section 2 "Protected Equip posted" block. (step 4.1.1.k)	The operator marks **YES**	
****16.**	Enters MODES in the "Applicability" block of section 2 of the RAS form. (step 4.1.1.l)	The operator enters **"Modes 1, 2, and 3"**	
****17.**	Enters the reference document in the "Reference Document" block of section 2 of the RAS form (step 4.1.1.m)	The operator enters **"TS 3.7.2 or similar wording"**	
18.	Enters the Revision/Amendment in the "Revision/Amendment" block of section 2 of the RAS form (step 4.1.1.n)	The operator enters **"281"**	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**19.	Enters the required action in the "REQ Action if Comp Time Exceeded" block of section 2 of the RAS form. (step 4.1.1.o)	The operator enters **"BE IN MODE 3 IN 12 HRS"**.	
**20.	Sign "SS SIGN/TSA" block of section 2 of the RAS form. (step 4.1.1.p)	The operator signs name	
21.	Enters less than 1 hour actions in the "≤ 1 Hour Actions" block of section 3 of the RAS form. (step 4.1.2)	The operator enters **N/A** or leaves **Blank.**	
**22.	Enters reference document in the "Reference Document" block of section 4 of the RAS form. (step 4.1.3.a)	The operator enters **"TS 3.7.2" or similar wording**.	
**23.	Enters the require action in the "Required Action" block of section 4 of the RAS form. (step 4.1.3.b)	The operator enters **"Restore 1P41-F310A to OPERABLE status"**	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**24.	Enters the required completion time or frequency in the "REQ Comp Time or Freq" block of section 4 of the RAS form. (step 4.1.3.c)	The operator enters **"30 days"**	
25.	Evaluates the RAS section 4 for the "Seq No." block. (step 4.1.3.d)	The operator enters **N/A** or leaves **Blank.**	

END TIME:__________

NOTE: The terminating cue shall be given to the Operator when:

- When the operator completes step 25.
- With NO reasonable progress, the Operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: That completes this JPM.

(Indicates critical step)**

Summary of JPM Attributes

JPM 2019-301 SRO Admin 3:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	12

Step 2 Assign a RAS number	Operator records 1-19-070
Step 4 Enter MPL	Operator enters 1P41-F310A
Step 6 Enter INOP Date /Time	Operator enters 0600 & 08/01/19
Step 9 Enter Initiation Date /Time	Operator enters 0600 & 08/01/19
Step 10 Enter Req Restoration Date /Time	Operator enters 0600 & 08/31/19
Step 16 Enter Applicability	Operator enters Modes 1, 2, 3
Step 17 Enter Reference Document	Operator enters U1 TS 3.7.2
Step 19 Enter Req Action if Comp Time Exceeded	Operator enters BE IN MODE 3 IN 12 HRS
Step 20 Sign SS SIGN	Operator sign name
Step 22 Enter Reference Document	Operator enters U1 TS 3.7.2
Step 23 Enter Req Action	Operator enters Restore to OPERABLE status
Step 24 Enter Req Comp Time	Operator enters 30 days

Number of JPM Steps	<30	25
Time to Perform JPM	<45 min	30 min

Normal / Faulted / Alternate Path

Normal

Setting (administered)

Classroom

Is LOD "1" or "5"	NO	NO

ATTACHMENT 1

**** KEY ****

DO NOT give this to operator

REQUIRED ACTION SHEET NUMBER **1 - 19 - 070**

SECTION 1 **INITIATING CONDITIONS**

MPL	DESCRIPTION	INOPERABLE TIME/DATE		RETURN TO OPER TIME/DATE		INIT
1P41-F310A	Turbine Bldg. Isolation Valve or similar wording	**0600**	**08/01/19**			

SECTION 2 **REQUIRED ACTION SHEET ACTIVATION**

INITIATION TIME/DATE:	REQ. RESTORATION TIME/DATE:	MODIFIED COMPLETION TIME/DATE:
0600 / 08-01-19	**0600 / 08-31-19**	**N/A** or **Blank**

EXTENDED COMPLETION TIME/DATE/INIT	SFDP ENTERED	INOP STATUS INDIC LIT	PROTECTED EQUIP POSTED
N/A or **Blank**	☐YES ☒N/A	☒YES ☐ N/A	☒YES ☐N/A

APPLICABILITY	**MODES 1, 2, and 3**	
REQ. ACTION IF COMP TIME EXCEEDED	**BE IN MODE 3 IN 12 HRS**	
REFERENCE DOCUMENT	**T.S. 3.7.2**	REVISION/AMENDMENT **281**

SS SIGN / TSA ACTIVE	SM SIGN
Student signature	

SECTION 5 **REQUIRED ACTION SHEET TERMINATION**

INDICATE COMPLETE(D) ACTIONS:

☐ PROCEDURES:

☐ OTHER:

MWO FT COMPLETE	INOP STATUS INDIC OFF	EQUIP POSTINGS REMOVED	REQUIRED ACTION TERMINATED TIME/DATE:
☐YES ☐N/A	☐YES ☐N/A	☐YES ☐N/A	/

SS SIGN / TSA TERMINATED	SM SIGN

SECTION 3 **< 1 HOUR ACTIONS**

REFERENCE DOCUMENT	REQUIRED ACTION *	REQ. COMP TIME	PERFORMED TIME/DATE	INIT
N/A	**N/A**	**N/A**	**N/A**	**N/A**
			/	
			/	

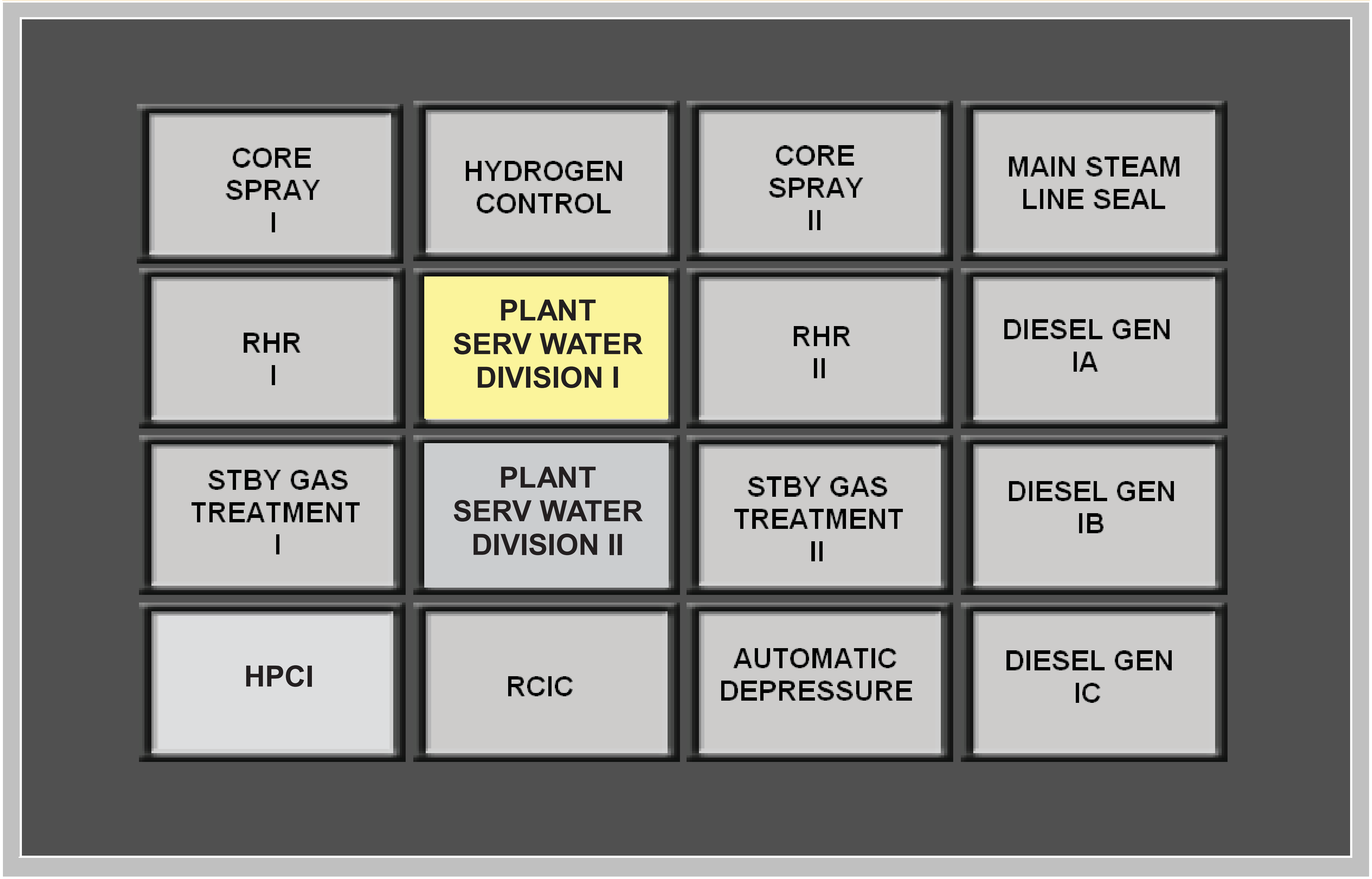
I

SECTION 4 **> 1 HOUR ACTIONS**

REFERENCE DOCUMENT	REQUIRED ACTION *	REQ. COMP TIME OR FREQ.	SEQ. NO.	COMPLETE TIME/DATE	COMP. INITIAL
TS 3.7.2	**Restore 1P41-F310A to OPERABLE status**	**30 days**	**N/A**	/	
				/	
	D			/	
				/	
				/	
				/	

*ADMIN CONTROL DOCUMENT FOR REQUIRED ACTION OR COMP ACTIONS FOR IDO's if required	APC # ☐ TAGOUT # ☐ REP TASK # ☐ OTHER ☐ REQURED ACTION TRACKING SHEET, OPS-1350, ☐	RAS REFERENCED ON ADMIN CONTROL DOCUMENT ________INIT	LOCKED OR SIGNED ON AS HOLDER FOR eSOMS if required ________INIT

ATTACHMENT 2
PROVIDE TO OPERATOR



ATTACHMENT 3
PROVIDE TO OPERATOR

2019

16

UNIT 1

INITIAL CONDITIONS:

1. Unit 1 is operating at 100% RTP.
2. At 0600 on 8/1/19 1P41-F310A, Turbine Building Isolation Valve, is declared inoperable due to a failed breaker.
3. The last Required Action Sheet Number listed in the Required Action Tracking Log is 1-19-69
4. All other equipment is operable.
5. Protected Equipment signs have been posted IAW NMP-OS-010, Protected Train/Division and Protected Equipment Program.
6. Shift Manager is out of the control room and will review the RAS at a later time.

INITIATING CUES:

Complete the Required Action Sheet, form OPS-1349, for Unit 1 1P41-F310A, Turbine Building Isolaton Valve.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
SRO ADMIN 4

Title: Evaluate an Inoperable ODCM Radiation Detector		**Version:** 1.0
Author: Anthony Ball	**Media Number:** 2019-301 SRO Admin 4	**Time:** 20 Minutes
Line Technical Review By (N/A for minor revisions) N/A		**Date:** N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		**Date:** N/A
Approved By (Training Program Manager or Lead Instructor) Charlie Edmund		**Date** 5/15/2019

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2017-301 SRO ADMIN 4

Ver. No.	Date	Reason for Revision	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ARB	ABG

UNIT 1 (X) UNIT 2 ()

TASK TITLE:	**Evaluate an Inoperable ODCM Radiation Detector**
JPM NUMBER:	**2019-301 SRO Admin 4**
TASK STANDARD:	The task shall be completed when the candidate has determined per the ODCM Chapter 3 that grab samples are to be collected once per day, Drywell Purge immediately suspended and if instrument is inoperable for over 30 days an explanation must be included in the Radioactive Effluent Release Report.
TASK NUMBER:	H-OPSR300.006
OBJECTIVE NUMBER:	H-OP300.006A
TYPE	SRO Administrative

PLANT HATCH JTA IMPORTANCE RATING:

RO N/A

SRO 3.00

K/A CATALOG NUMBER: G2.3.11

K/A CATALOG JTA IMPORTANCE RATING:

RO N/A

SRO 4.3

OPERATOR APPLICABILITY: Senior Reactor Operator (SRO)

GENERAL REFERENCES:	**Unit 1**
	Unit 1 Tech Specs Unit 1 TRM Unit 1 ODCM, Ch 3.1

REQUIRED MATERIALS:	**Unit 1**
	Unit 1 TRM Unit 1 ODCM, Ch 3.1

VALIDATION TIME: 20 Minutes

SIMULATOR SETUP: N/A

EVALUATOR COPY

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 1 is at 20% RTP shutting down by rod insertion IAW 34GO-OPS-013-1, Normal Plant Shutdown.

2. Drywell Purge is currently in progress.

3. 1D11-K600A and 1D11-K600B, Main Stack Effluent Radiation Monitors A & B, are both downscale due to an internal failure.

INITIATING CUES:

Determine the following:

1) Can a release from this pathway continue? Yes / No

2) Required actions, if any, for 1D11-K600A and 1D11-K600B inoperability.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME: __________

1.	Applicant obtains the procedure needed references	Applicant has obtained the Unit 1 ODCM and other controlled documents.	

****2.**	Determine if 1D11-K600A & K600B are ODCM radiation detectors.	Applicant determines the instruments are required ODCM detector.	
3.	Locate the administrative requirements associated with these radiation detectors.	The Applicant identifies that ODCM Section 3.1 contains the requirements for these radiation detectors being inoperable.	
4.	Selects the applicable instruments on Table 3-1 of the Unit 1 ODCM.	On Table 3-1 determines the inoperative detectors are addressed in Section 3 of the Table, as these instruments do not provide any automatic isolation.	
5.	Evaluates whether the minimum number of channels OPERABLE is met from Table 3.	Recognizes the minimum number of channels is NOT met.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
6.	Evaluates the applicability of the specification, whether the instrument is required to be OPERABLE, under the current plant conditions.	Determines Note (a) applies: "a. During radioactive releases via this pathway."	
**7.	Evaluates the system for a release path.	Determines that a radioactive release is via this pathway (Main Stack) since this is the outlet of the SBGT train that is aligned during containment purge. This is also the normal offgas release during operation for both Units when a SJAE is in service and a main steam line not isolated.	

NOTE: ONLY Action 105 is applicable:

Action 104 is only applicable to the Effluent system and Sampler Flowrate measurement devices.

Action 107 is only applicable to the Iodine Sampler Cartridge and Particulate Sampler Filter.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**8.	Identifies the actions required by action 105.	Determines that once per day grab samples are collected and analyzed for a gross radioactivity.	
**9.	Evaluates the suspension of Drywell Purge.	IAW action 105 determines that Drywell Purge must be suspended immediately when the number of operable main stack monitor channels are less than the minimum channels required.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**10.	Identifies how long the instrument may remain inoperable before "additional" actions are required.	Identifies that if the instrument is inoperative for over 30 days: • "An explanation of the circumstances must be included in the next Radioactive Effluent Release Report."	

END TIME: __________

NOTE: The terminating cue shall be given to the Applicant when:

- After JPM step #10 is complete.
- With NO reasonable progress, the Applicant exceeds double the allotted time.
- Applicant states the task is complete.

TERMINATING CUE: That completes this JPM.

EVALUATOR COPY

ANSWER SHEET	
Can releases from this pathway continue?	YES / NO
If 1D11-K600A & B, Main Stack Effluent Radiation Monitors A & B, are required to be operable, list all actions (initial and follow up) that may be required.	Grab samples are to be collected once per day and analyzed for gross radioactivity. Drywell Purge must be suspended. If the instrument is inoperable for over 30 days and explanation of the circumstances must be included in the next Radioactive Effluent Release Report.

Summary of JPM Attributes

JPM 2019-301 SRO Admin 4:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	5

Step 2 Determine if 1D11K600A & B are in ODCM	Operator determines the instruments are required ODCM detectors.
Step 7 Determine a release path exists	A release path meets the entrance criteria for this spec.
Step 8 Determine actions required per 105	Determines that once per shift grab samples are collected and analyzed for a gross radioactivity.
Step 9 Identifies the suspension of Drywell Purge	Determines that Drywell Purge must be suspended.
Step 10 Identifies time limit for additional actions	Identifies that if the instrument is inoperative for over 30 days: "An explanation of the circumstances must be included in the next Radioactive Effluent Release Report."

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Number of JPM Steps	<30	10
Time to Perform JPM	<45 min	20 min

Normal / Faulted / Alternate Path

Normal

Setting (administered)

Classroom

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Is LOD "1" or "5"	NO	NO

UNIT 1

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Unit 1 is at 20% RTP shutting down by rod insertion IAW 34GO-OPS-013-1, Normal Plant Shutdown.

2. Drywell Purge is currently in progress.

3. 1D11-K600A and 1D11-K600B, Main Stack Effluent Radiation Monitors A & B, are both downscale due to internal failure.

INITIATING CUES:

Determine the following:

1) Can a release from this pathway continue? Yes / No

2) Required actions, if any, for 1D11-K600A and 1D11-K600B inoperability.

Southern Nuclear Company

Operations Training
Job Performance Measure (JPM)

DRAFT
SRO ADMIN 5

Title		Version
Emergency Classification - Complete NMP-EP-141-F01		1.0
Author: Art Genereux	**Media Number** 2019-301 SRO ADMIN 5	**Time Critical** **2 Requirement Times** 15.0 Minutes 10.0 Minutes
Line Review By: **N/A**		**Date** **N/A**
Reviewed by Instructional Technologist or designee: **N/A**		**Date** **N/A**
Approved By (Training Program Manager or Lead Instructor) **Charlie Edmund**		**Date** **5/15/2019**

Course Number	Program Name	Media Number
N/A	OPERATIONS TRAINING	2019-301 SRO ADMIN 5

Ver. No.	Date	Reason for Revisions	Author Print Initials/Name	Peer Review Print Initials/Name
1.0	5/15/2019	Developed for ILT-12 NRC Exam 2019-301	ABG	ARB

UNIT 1 (X) UNIT 2 (X)

TASK TITLE:	Emergency Classification - Complete NMP-EP-141-F01
JPM NUMBER:	**2019-301 SRO ADMIN 5**
TASK STANDARD:	The task shall be completed when the event has been classified and NMP-EP-141 Form 1 is completed through step 7 within the critical time limits.

TASK NUMBER: 200.052

OBJECTIVE NUMBER: 200.052.A

PLANT HATCH JTA IMPORTANCE RATING:

RO N/A

SRO 4.4

K/A CATALOG NUMBER: Generic 2.4.41

K/A CATALOG JTA IMPORTANCE RATING:

RO N/A

SRO 4.6

OPERATOR APPLICABILITY: SRO

GENERAL REFERENCES:	**Unit 1 & 2**
	NMP-EP-141-002, Hatch Emergency Action Levels and Bases, (Ver 3.0,) NMP-EP-141-002-F01, EAL Classifcation Matrix, (Ver 2.0) NMP-EP-141-F01, Emergency Classification Determination, (Ver. 2.0,)

REQUIRED MATERIALS:	**Unit 1 & 2**
	NMP-EP-141-002, Hatch Emergency Action Levels and Bases, (Ver 3.0,) NMP-EP-141-002-F01, EAL Classifcation Matrix, (Ver 2.0) NMP-EP-141-F01, Emergency Classification Determination, (Ver. 2.0,)

APPROXIMATE COMPLETION TIME: **15.0** Minutes

SIMULATOR SETUP: NA

EVALUATOR COPY

UNIT 1 & 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. You are the On Shift Shift Manager.
2. **Unit 2** is in a LOSP due to a failure of the "2C", "2D" and "2E" SUTs and a Loss of all onsite Emergency AC power due to a failure of all three Emergency Diesel Generators to start.
3. The Reactor scrammed and All rods fully inserted on the scram signal.
4. For the last 16 minutes, Emergency Diesel Generator start attempts have not been successful on any Emergency Diesel.
5. Maintenance estimates that the "2A" Emergency Diesel can be returned to service in 1 hour.
6. RWL is at -30 inches and being restored to the normal band using HPCI and RCIC.
7. All other Unit 2 parameters are in the desired bands.
8. The following **Unit 1** conditions exists:
   100% power
   All parameters normal
9. NO Peer Check is available.

INITIATING CUES:

EXAM SECURITY CAUTION:
Do Not Make Any Verbal Crew Announcements During This JPM

1. Evaluate the current plant conditions and determine the EAL by completing NMP-EP-141-F01, Emergency Classification Determination, Items 1 – 6. **(TIME CRITICAL)**

   When Items 1 – 6 are complete, IMMEDIATELY raise your hand so the evaluator can log your declaration and time of declaration.

2. AFTER the evaluator has logged your declaration, complete NMP-EP-141-F01, Item 7. **(TIME CRITICAL)**

   When Item 7 is complete, IMMEDIATELY raise your hand so the evaluator can take your paperwork and log your time.

Current time is: ___________________

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)

For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	❑ Human performance tools, safety, PPE met (1), **AND** ❑ For initial trg **all** steps completed correctly OR ❑ For continuing trg, **critical** steps (if used) completed correctly	❑ Mark the JPM as a **PASS**
FAIL	❑ Above standards not met	❑ Mark the JPM as a **FAIL**

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

NOTE: The **CLASSIFICATION** must be made within 15 minutes of the initial prompt and the Student states they understand the initial conditions.

NOTE: The Student is expected to obtain a copy of NMP-EP-141-F01 (Form 1) if the Initiating Cue is given in the Simulator or Control Room.

Start Time:________

1.	Operator identifies the procedure(s) needed to perform the task which includes Form 1, Step 1. **Refer** to the site specific IC/EAL Matrix Evaluation Charts	The operator has OBTAINED NMP-EP-141-F01 and IC/EAL Matrix Evaluation Charts.	
2.	Form 1, Step 2. **Determine** the appropriate IC/EAL Matrix Evaluation Chart for classification of the event based on the current operating mode: HOT IC/EAL Matrix Eval Chart COLD IC/EAL Matrix Eval Chart	On Form 1, Step 1, The operator has selected **HOT IC/EAL** Matrix Evaluation Chart.	

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
3.	Form 1, Step 3. **Evaluate** the status of the fission product barriers. Fuel Cladding Integrity ****************** ******************	On Form 1, Step 3, The operator has selected **INTACT** for Fuel Cladding Integrity.	
4.	Form 1, Step 3. **Evaluate** the status of the fission product barriers. ****************** Reactor Coolant System ******************	On Form 1, Step 3, The operator has selected **INTACT** for Reactor Cooling System.	
5.	Form 1, Step 3. **Evaluate** the status of the fission product barriers. ****************** ****************** Containment Integrity	On Form 1, Step 3, The operator has selected **INTACT** for Containment Integrity.	
6.	Form 1, Step 3.a. **Determine** the highest applicable Fission Product Barrier Initiating Condition (IC).	On Form 1, Step 3.a, The operator has selected **NONE**	
7.	Form 1, Step 4. **Record** the highest applicable IC/EAL.	On Form 1, Step 4. The operator has identified **SS1 for Unit 2.**	
****8.**	Form 1, Step 5. **Check** the highest emergency classification level identified from either step 3.a OR 4: **Classification** ***********	On Form 1, Step 5. The operator has selected **SAE** as the Classification.	

(** Indicates critical step)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**9.	Form 1, Step 5. **Check** the highest emergency classification level identified from either step 3.a OR 4: ********** **Based on IC #**	On Form 1, Step 5. The operator has selected **SS1** for the Based on IC#.	
10.	Form 1, Step 5. Remarks (**Identify** the specific EAL, as needed).	On Form 1, Step 5. The operator has written **Loss of all AC power indicated by Loss of both SATs, Failure of all EDGs to supply power with loss of power for > 15 min** in the space provided.	

NOTE: If follow-up questioning reveals that a classification was declared and based on another IC #, the classification should be evaluated for validity.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**11.	Form 1, Step 6. **Approve** the emergency classification AND **declare** the event.	On Form 1, Step 6. The operator has **signed their name** as the Emergency Director in the space provided.	
**12.	Form 1, Step 6. Fill in the Date in the space provided.	On Form 1, Step 6. The operator has entered the **current Date** in the space provided.	

(** Indicates critical step)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**13.	Form 1, Step 6. Fill in the Time in the space provided.	On Form 1, Step 6. The operator has entered the **current Time** in the space provided. **Time Critical** **Stop Time:** _______________. NOTE: For this step to be completed considered SAT, the time entered must be within 15 minutes of the time recorded on the Initial Conditions sheet provided to the operator.	

NOTE: Operator raising hand Stops Time Critical. Evaluator logs completion time and IC #.

START New Critical Time after Evaluator has recoreded time and logged results from above.

Second Start Time:_________

PROMPT: **WHEN** the operator enquires about meteorological conditions, **GIVE** the operator the MIDAS Information Sheet if not given earlier when performing a Group JPM.

14.	On Form 1, Step 7. **Obtain** Meteorological Data (not required prior to event declaration).	The operator has obtained Meteorological Data (i.e. MIDAS Information Sheet).	

**15.	On Form 1, Step 7. Record the following: Wind Direction (from) ************ *********** *********	On Form 1, Step 7. The operator has entered **130** in the space provided for **Wind Direction (from).**	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**16.	On Form 1, Step 7. Record the following: ******************* Wind Speed *********** ***********	On Form 1, Step 7. The operator has entered **5** in the space provided for **Wind Speed**.	
**17.	On Form 1, Step 7. Record the following: **************** *********** Precipitation ***********	On Form 1, Step 7. The operator has entered **0** in the space provided for **Precipitation**.	
**18.	On Form 1, Step 7. Record the following: ***************** ********** ********** Stability Class	On Form 1, Step 7. The operator has entered **D** in the space provided for **Stability Class**. **Time Critical** **Stop Time:** ____________ NOTE: For this step to be completed considered SAT, the time entered must be within 10 minutes of the time recorded on step 13.	

PROMPT: Operator raises hand to stop Time Critical Clock.

PROMPT: If the operator addresses performance of Form 1 Steps 8-10, **INFORM** the operator that another operator will complete Form 1, Steps 8-10.

End Time:__________

NOTE: The terminating cue shall be given to the operator when any of the following conditions are met:

- Operator completes step 18 of this JPM.
- The operator exceeds the allotted time of 25 minutes.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

(** **Indicates critical step)**

Summary of JPM Attributes

JPM 2019-301 SRO ADMIN 5:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

CATEGORY	Minimum NRC Attributes	JPM CONTENT
Total Critical Steps	At least 2	9
Step 8 Annotate Emerg Classification		SRO identifies the highest Emergency Classification from Hot / Cold / Fission Product Barrier Charts so the State is accurately informed and proper decisions made.
Step 9 Highest Emerg Classification		SRO identifies the highest Emergency Classification from Hot / Cold / Fission Product Barrier Charts so the State is accurately informed and proper decisions made.
Step 11 Approval Signature		Operator has signed for approval and verification that information is correct.
Step 12 Date		Accurate date of classification required for accurate records
Step 13 Correct Time of EAL		Correct time is important for ensuring the event is classified within 15 minutes and timely and accurate information is provided to the State and Locals.
Step 15 Enters Wind Direction		Correct Wind direction is important for ensuring the off-site response organizations are aware of plume area.
Step 16 Enters Wind Speed		Correct Wind speed is important for ensuring the off-site response organizations are aware of plume area.
Step 17 Enters Precipitation		Correct Precipitation is important for ensuring the off-site response organizations are aware of plume area.
Step 18 Enters Stability Class		Correct Stability Class is important for ensuring the off-site response organizations are aware of plume area.
Number of JPM Steps	<30	18
Time to Perform JPM	<45 min	15 min / 10 min (Time Critical)

Normal / Faulted / Alternate Path

Admin (Normal) — Normal Emergency Classification of an event.

Setting (administered)

Anywhere reference material is available

Is LOD "1" or "5"	NO	NO

NOTE
The site specific emergency classification document is the controlling procedure for classification. The Initiating Condition (IC)/Emergency Action Level (EAL) Matrix Evaluation Charts are to be used as tools to assist the Emergency Director (ED) in determining emergency classification.

Refer to the site specific IC/EAL Matrix Evaluation Charts.

Determine the appropriate IC/EAL Matrix Evaluation Chart for classification based on the current operating mode.

- ■ HOT IC/EAL Matrix Evaluation Chart (FNP/VEGP: Modes 1-4; HNP: Modes 1-3)
- ❑ COLD IC/EAL Matrix Evaluation Chart (FNP/VEGP: Modes 5-6 & None; HNP: Modes 4-5 & None)

IF the HOT IC/EAL Matrix Evaluation Chart is applicable, **evaluate** the status of the Fission Product Barriers.

Fission Product Barrier	LOSS	POTENTIAL LOSS	INTACT
Fuel Clad Integrity	❑	❑	■
Reactor Coolant System	❑	❑	■
Containment Integrity	❑	❑	■

Determine the highest applicable Fission Product Barrier IC (select one).
❑ FG1 ❑ FS1 ❑ FA1 ■ None

Record the highest applicable IC/EAL.

Hot IC/EAL #	SS1	Unit	______	❑ None
Cold IC/EAL #	______	Unit	______	❑ None

Document the highest emergency classification level determined from either Step 3.a OR 4.

Classification	**Based on IC #**	**Classification**	**Based on IC #**	
❑ General Emergency	______	❑ Alert	______	❑ None
■ Site Area Emergency	SS1	❑ Unusual Event	______	

Remarks (**Identify** the specific EAL threshold, as needed): Loss of all AC power indicated by loss of both all SATs. Failure of EDGs to supply power with of power for .> 15 min.

NOTE
- Completion of Line 6 constitutes the official emergency declaration time.
- Lines 7 – 10 not required prior to event declaration.

Approve the emergency classification AND **declare** the event.

Student Date: ***** / ***** / ***** Time: ******
Emergency Director

Obtain Meteorological Data.

Wind Direction (from) 130 Wind Speed 5 Precipitation 0 Stability Class 0

HAS a radiological release occurred?	❑ YES	❑ NO
IS a radiological release occurring?	❑ YES	❑ NO
IS/WAS the release above normal operating limits	❑ YES	❑ NO

MIDAS INFORMATION

METEOROLOGICAL

10M WIND SPD	100M WIND SPD	10M WIND DIR	100M WIND DIR
1Y33-R601	1Y33-R603	1Y33-R601	1Y33-R603
5.0	5.0	130	130

AMBIENT TEMP	DELTA T	DELTA T	RAINFALL
(F) 10M	60-10	100-10	15 MIN. AVG
54	-1.6	-2.9	.000

RADIOLOGICAL

MAIN STACK		U1 RX. BLDG. VENT		U2 RX. BLDG. VENT	
NORMAL RANGE	KAMAN	NORMAL RANGE	KAMAN	NORMAL RANGE	KAMAN
1D11-K600A	1D11-R631	1D11-K619A	1D11-R631	2D11-K636A	2D11-R631
2.00E 01		5.04E 01		4.00E 01	
1D11-K600B		1D11-K619B		2D11-K636B	
2.00E 01				4.00E 01	

STABILITY CLASS
D

UNIT 1 & 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. You are the On Shift Shift Manager.
2. **Unit 2** is in a LOSP due to a failure of the "2C", "2D" and "2E" SUTs and a Loss of all onsite Emergency AC power due to a failure of all three Emergency Diesel Generators to start.
3. The Reactor scrammed and All rods fully inserted on the scram signal.
4. For the last 16 minutes, Emergency Diesel Generator start attempts have not been successful on any Emergency Diesel.
5. Maintenance estimates that the "2A" Emergency Diesel can be returned to service in 1 hour.
6. RWL is at -30 inches and being restored to the normal band using HPCI and RCIC.
7. All other Unit 2 parameters are in the desired bands.
8. The following **Unit 1** conditions exists:
   100% power
   All parameters normal
9. NO Peer Check is available.

INITIATING CUES:

EXAM SECURITY CAUTION:
Do Not Make Any Verbal Crew Announcements During This JPM

1. Evaluate the current plant conditions and determine the EAL by completing NMP-EP-141-F01, Emergency Classification Determination, Items 1 – 6. **(TIME CRITICAL)**

   When Items 1 – 6 are complete, IMMEDIATELY raise your hand so the evaluator can log your declaration and time of declaration.

2. AFTER the evaluator has logged your declaration, complete NMP-EP-141-F01, Item 7. **(TIME CRITICAL)**

   When Item 7 is complete, IMMEDIATELY raise your hand so the evaluator can take your paperwork and log your time.

Current time is: ___________________