ES-201 **Examination Outline Quality Checklist** **Form ES-201-2**

Facility: **VC Summer** Date of Examination: **May 2010**

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.	CAK	N/A	BN
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	CAK	N/A	BN
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	CAK	N/A	BN
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	CAK	N/A	BN
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.	n/a	n/a	n/a
	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.	n/a	n/a	n/a
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	n/a	n/a	n/a
3. W/T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.	n/a	n/a	n/a
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations	n/a	n/a	n/a
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.	n/a	n/a	n/a
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	N/A	N/A	N/A
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	CAK	N/A	BN
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	CAK	N/A	BN
	d. Check for duplication and overlap among exam sections.	n/a	n/a	n/a
	e. Check the entire exam for balance of coverage.	n/a	n/a	n/a
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	CAK	N/A	BN

	Printed Name/Signature	Date
a. Author	Craig Kontz	2/13/09
b. Facility Reviewer (*)		
c. NRC Chief Examiner (#)	BRUNO CABALLERO / B. Caballero	2/13/09
d. NRC Supervisor	MALCOLM T. WIDMANN / [signature]	02/17/09

Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.
* Not applicable for NRC-prepared examination outlines

This outline (written only) provided to licensee in Feb 2009 for early start on development. BN

ES-401 **PWR Examination Outline** **Form ES-401-2**

Facility: **VC Summer** Date of Exam: **May 2010**

<table>
<tr><th rowspan="2">Tier</th><th rowspan="2">Group</th><th colspan="12">RO K/A Category Points</th><th colspan="3">SRO-Only Points</th></tr>
<tr><th>K 1</th><th>K 2</th><th>K 3</th><th>K 4</th><th>K 5</th><th>K 6</th><th>A 1</th><th>A 2</th><th>A 3</th><th>A 4</th><th>G *</th><th>Total</th><th>A2</th><th>G*</th><th>Total</th></tr>
<tr><td rowspan="3">1. Emergency & Abnormal Plant Evolutions</td><td>1</td><td>3</td><td>3</td><td>3</td><td colspan="3" rowspan="3">N/A</td><td>3</td><td>3</td><td colspan="2" rowspan="3">N/A</td><td>3</td><td>18</td><td>3</td><td>3</td><td>6</td></tr>
<tr><td>2</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>9</td><td>2</td><td>2</td><td>4</td></tr>
<tr><td>Tier Totals</td><td>5</td><td>4</td><td>5</td><td>4</td><td>5</td><td>4</td><td>27</td><td>5</td><td>5</td><td>10</td></tr>
<tr><td rowspan="3">2. Plant Systems</td><td>1</td><td>3</td><td>2</td><td>3</td><td>3</td><td>2</td><td>3</td><td>2</td><td>3</td><td>2</td><td>3</td><td>2</td><td>28</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td>2</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>10</td><td>0 | 2</td><td>1</td><td>3</td></tr>
<tr><td>Tier Totals</td><td>4</td><td>3</td><td>4</td><td>4</td><td>3</td><td>4</td><td>3</td><td>4</td><td>2</td><td>4</td><td>3</td><td>38</td><td>5</td><td>3</td><td>8</td></tr>
<tr><td colspan="5" rowspan="2">3. Generic Knowledge and Abilities Categories</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td rowspan="2">10</td><td>1 | 2</td><td>3 | 4</td><td rowspan="2">7</td></tr>
<tr><td colspan="2">3</td><td colspan="2">2</td><td colspan="2">2</td><td colspan="2">3</td><td>2 | 2</td><td>2 | 1</td></tr>
</table>

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/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. 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. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401 | PWR Examination Outline | Form ES-401-2

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

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1		R				S	R: EK2.03 S: EG2.4.34	R3.5 S4.1	
000008 Pressurizer Vapor Space Accident / 3				R			R: AA1.05	R3.4	
000009 Small Break LOCA / 3	R						R: K1.01	R4.2	
000011 Large Break LOCA / 3						S	S: EG2.4.21	S4.6	
000015/17 RCP Malfunctions / 4		R					R: K2.10	R2.8	
000022 Loss of Rx Coolant Makeup / 2						R	R: AG2.4.11	R4.0	
000025 Loss of RHR System / 4	R				S		R: AK1.01 S: AA2.04	R3.9 S3.6	
000026 Loss of Component Cooling Water / 8			R				R: AK3.02	R3.6	
000027 Pressurizer Pressure Control System Malfunction / 3					S		S: AA2.01	S3.8	
000029 ATWS / 1		R					R: EK2.06	R2.9	
000038 Steam Gen. Tube Rupture / 3					R		R: EA2.04	R3.9	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4				R			R: EA1.2	R3.6	
000054 (CE/E06) Loss of Main Feedwater / 4						R	R: AG2.1.31	R4.6	
000055 Station Blackout / 6					R		R: EA2.06	R3.7	
000056 Loss of Off-site Power / 6			R			S	R: AK3.02 S: AG2.1.19	R4.4 S3.8	
000057 Loss of Vital AC Inst. Bus / 6					R		R: AA2.12	R3.5	
000058 Loss of DC Power / 6						R	R: AG2.2.36	R3.1	
000062 Loss of Nuclear Svc Water / 4					S		S: AA2.03	S2.9	
000065 Loss of Instrument Air / 8				R			R: AA1.03	R2.9	
W/E04 LOCA Outside Containment / 3	R						R: EK1.3	R3.5	
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
000077 Generator Voltage and Electric Grid Disturbances / 6			R				R: AK3.02	R3.6	
K/A Category Totals: (RO)	3	3	3	3	3	3	Group Point Total:		18/6
(SRO)					3	3			

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)								Form ES-401-2
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1	R						R: AK1.21	R2.7	
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2		R					R: AK2.03	R2.6	
000032 Loss of Source Range NI / 7					R		R: AA2.03	R2.8	
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8					R		R: AA2.03	R3.1	
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9	R				S		R: AK1.01 S: AA2.03	R2.7 S3.6	
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 8									
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5									
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9									
W/EO1 & E02 Rediagnosis & SI Termination / 3						R	R: EG2.2.44 (W/E02)	R4.2	
W/E13 Steam Generator Over-pressure / 4			R		S		R: EK3.4 S: EA2.2	R3.1 S3.4	
W/E15 Containment Flooding / 5				R			R: EA1.3	R2.8	
W/E16 High Containment Radiation / 9						S	S: EG2.4.30	S4.1	
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4			R				R: EK3.4 (W/E10)	R3.4	
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4						S	S: EG2.4.21 (W/E08)	S4.6	
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals: (RO)	2	1	2	1	2	1	Group Point Total:		9/4
(SRO)					2	2			

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

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump					R							R: K5.04	R3.2	
004 Chemical and Volume Control				R				R				R: A2.09 R: K4.07	R3.0 R3.0	
005 Residual Heat Removal			R			R						R: K3.01 R: K6.03	R3.9 R2.5	
006 Emergency Core Cooling									R			R: A3.01	R4.0	
007 Pressurizer Relief/Quench Tank										R	R	R: A4.10 R: G2.4.18	R3.6 R3.3	
008 Component Cooling Water							R					R: A1.01	R2.8	
010 Pressurizer Pressure Control										R		R: A4.01	R3.7	
012 Reactor Protection					R	R		S				R: K5.01 R: K6.03 S: A2.01	R3.3 R3.1 S3.6	
013 Engineered Safety Features Actuation								R				R: A2.01	R4.6	
022 Containment Cooling	R									R		R: A4.02 R: K1.01	R3.2 R3.5	
025 Ice Condenser												NOT APPLICABLE		
026 Containment Spray		R										R: K2.01	R3.4	
039 Main and Reheat Steam							R				S	R: A1.05 S: G2.4.11	R3.2 S4.2	
059 Main Feedwater											R	R: G2.4.11	R4.0	
061 Auxiliary/Emergency Feedwater						R						R: K6.02	R2.6	
062 AC Electrical Distribution		R										R: K2.01	R3.3	
063 DC Electrical Distribution				R				R S				R: A2.01 R: K4.04 S: A2.02	R2.5 R2.6 S3.1	
064 Emergency Diesel Generator	R								R			R: A3.03 R: K1.05	R3.4 R3.4	
073 Process Radiation Monitoring			R									R: K3.01	R3.6	
076 Service Water			R					S				R: K3.05 S: A2.01	R3.0 S3.7	
078 Instrument Air	R											R: K1.01	R2.8	
103 Containment				R							S	R: K4.04 S: G2.4.18	R2.5 S4.0	
K/A Category Point Totals: (RO)	3	2	3	3	2	3	2	3	2	3	2	Group Point Total:		28/5
(SRO)								3			2			

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)												Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive		R										R: K2.01	R3.5	
002 Reactor Coolant					R							R: K5.14	R3.7	
011 Pressurizer Level Control				R								R: K4.03	R2.6	
014 Rod Position Indication														
015 Nuclear Instrumentation														
016 Non-nuclear Instrumentation								R				R: A2.01	R3.0	
017 In-core Temperature Monitor														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control											S	S: G2.2.40	S4.7	
029 Containment Purge														
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment														
035 Steam Generator						R						R: K6.01	R3.2	
041 Steam Dump/Turbine Bypass Control	R											R: K1.02	R2.7	
045 Main Turbine Generator											R	R: G2.4.31	R4.2	
055 Condenser Air Removal														
056 Condensate														
068 Liquid Radwaste														
071 Waste Gas Disposal							R					R: A1.06	R2.5	
072 Area Radiation Monitoring								S				S: A2.03	S2.9	
075 Circulating Water														
079 Station Air										R		R: A4.01	R2.7	
086 Fire Protection			R					S				R: K3.01 S: A2.01	R2.7 S3.1	
K/A Category Point Totals: (RO)	1	1	1	1	1	1	1	1	0	1	1	Group Point Total:		10/3
(SRO)								2			1			

ES-401 **Generic Knowledge and Abilities Outline (Tier 3)** **Form ES-401-3**

Facility: VC Summer		Date of Exam: May 2010				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.2	R: G2.1.2	4.1			
	2.1.29	R: G2.1.29	4.1			
	2.1.31	R: G2.1.31	4.6			
	2.1.3	S: G2.1.3			3.9	
	2.1.4	S: G2.1.4			3.8	
	Subtotal		3		2	
2. Equipment Control	2.2.35	R: G2.2.35	3.6			
	2.2.37	R: G2.2.37	3.6			
	2.2.25	S: G2.2.25			4.2	
	2.2.38	S: G2.2.38			4.5	
	Subtotal		2		2	
3. Radiation Control	2.3.13	R: G2.3.13	3.4			
	2.3.11	R: G2.3.11	3.8			
	2.3.12	S: G2.3.12			3.7	
	2.3.14	S: G2.3.14			3.8	
	Subtotal		2		2	
4. Emergency Procedures / Plan	2.4.31	R: G2.4.31	4.2			
	2.4.34	R: G2.4.34	4.2			
	2.4.39	R: G2.4.39	3.9			
	2.4.37	S: G2.4.37			4.1	
	Subtotal		3		1	
Tier 3 Point Total			10	10	7	7

Facility: SUMMER	Date of Exam: 2010															
Tier	Group	RO K/A Category Points												SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	3	3	6
	2	2	1	2				1	2			1	9	2	2	4
	Tier Totals	5	4	5				4	5			4	27	5	5	10
2. Plant Systems	1	3	2	3	3	2	3	2	3	2	3	2	28	3	2	5
	2	1	1	1	1	1	1	1	1	0	1	1	10	2	1	3
	Tier Totals	4	3	4	4	3	4	3	4	2	4	3	38	5	3	8

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

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. *The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note # 1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. 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.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EK2.03	Reactor Trip - Stabilization - Recovery / 1	3.5	3.6		✔										Reactor trip status panel
008AA1.05	Pressurizer Vapor Space Accident / 3	3.4	3.3							✔					LPI System
009EK1.01	Small Break LOCA / 3	4.2	4.7	✔											Natural circulation and cooling, including reflux boiling
015AK2.10	RCP Malfunctions / 4	2.8	2.8		✔										RCP indicators and controls
022AG2.4.11	Loss of Rx Coolant Makeup / 2	4.0	4.2											✔	Knowledge of abnormal condition procedures.
025AK1.01	Loss of RHR System / 4	3.9	4.3	✔											Loss of RHRS during all modes of operation
026AK3.02	Loss of Component Cooling Water / 8	3.6	3.9			✔									The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS
029EK2.06	ATWS / 1	2.9	3.1		✔										Breakers, relays, and disconnects.
038EA2.04	Steam Gen. Tube Rupture / 3	3.9	4.2								✔				Radiation levels (MREM/hr)
054AG2.1.31	Loss of Main Feedwater / 4	4.6	4.3											✔	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
055EA2.06	Station Blackout / 6	3.7	4.1								✔				Faults and lockouts that must be cleared prior to re-energizing buses

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
056AK3.02	Loss of Off-site Power / 6	4.4	4.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOP for loss of offsite power
057AA2.12	Loss of Vital AC Inst. Bus / 6	3.5	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	PZR level controller, instrumentation and heater indications
058AG2.2.36	Loss of DC Power / 6	3.1	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions of operations
065AA1.03	Loss of Instrument Air / 8	2.9	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Restoration of systems served by instrument air when pressure is regained
077AK3.02	Generator Voltage and Electric Grid Disturbances / 6	3.6	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in abnormal operating procedures for voltage and grid disturbances
WE04EK1.3	LOCA Outside Containment / 3	3.5	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Outside Containment).
WE12EA1.2	Steam Line Rupture - Excessive Heat Transfer / 4	3.6	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Operating behavior characteristics of the facility.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003AK1.21	Dropped Control Rod / 1	2.7	3.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Delta flux (I)
028AK2.03	Pressurizer Level Malfunction / 2	2.6	2.9	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Controllers and positioners
032AA2.03	Loss of Source Range NI / 7	2.8	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Expected values of source range indication when high voltage is automatically removed
036AA2.03	Fuel Handling Accident / 8	3.1	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Magnitude of potential radioactive release
059AK1.01	Accidental Liquid RadWaste Rel. / 9	2.7	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Types of radiation, their units of intensity and the location of the sources of radiation in a nuclear power plant
we02EG2.2.44	SI Termination / 3	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
WE10EK3.4	Natural Circ. With Seam Void/ 4	3.4	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.
WE13EK3.4	Steam Generator Over-pressure / 4	3.1	3.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.
WE15EA1.3	Containment Flooding / 5	2.8	3.0	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Desired operating results during abnormal and emergency situations.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003K5.04	Reactor Coolant Pump	3.2	3.5	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Effects of RCP shutdown on secondary parameters, such as steam pressure, steam flow and feed flow
004A2.09	Chemical and Volume Control	3.0	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	High primary and/or secondary activity
004K4.07	Chemical and Volume Control	3.0	3.3	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Water supplies
005K3.01	Residual Heat Removal	3.9	4.0	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RCS
005K6.03	Residual Heat Removal	2.5	2.6	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	RHR heat exchanger
006A3.01	Emergency Core Cooling	4.0	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Accumulators
007A4.10	Pressurizer Relief/Quench Tank	3.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Recognition of leaking PORV/code safety
007G2.4.18	Pressurizer Relief/Quench Tank	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the specific bases for EOPs.
008A1.01	Component Cooling Water	2.8	2.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	CCW flow rate
010A4.01	Pressurizer Pressure Control	3.7	3.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	PZR spray valve
012K5.01	Reactor Protection	3.3	3.8	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	DNB

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
012K6.03	Reactor Protection	3.1	3.5						✓						Trip logic circuits
013A2.01	Engineered Safety Features Actuation	4.6	4.8								✓				LOCA
022A4.02	Containment Cooling	3.2	3.1										✓		CCS pumps
022K1.01	Containment Cooling	3.5	3.7	✓											SWS/cooling system
026K2.01	Containment Spray	3.4	3.6		✓										Containment spray pumps
039A1.05	Main and Reheat Steam	3.2	3.3							✓					RCS T-ave
059G2.4.11	Main Feedwater	4.0	4.2											✓	Knowledge of abnormal condition procedures.
061K6.02	Auxiliary/Emergency Feedwater	2.6	2.7						✓						Pumps
062K2.01	AC Electrical Distribution	3.3	3.4		✓										Major system loads
063A2.01	DC Electrical Distribution	2.5	3.2								✓				Grounds
063K4.04	DC Electrical Distribution	2.6	2.9				✓								Trips

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
064A3.03	Emergency Diesel Generator	3.4	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Indicating lights, meters and recorders
064K1.05	Emergency Diesel Generator	3.4	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Starting air system
073K3.01	Process Radiation Monitoring	3.6	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Radioactive effluent releases
076K3.05	Service Water	3.0	3.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RHR components, controls, sensors, indicators and alarms, including rad monitors
078K1.01	Instrument Air	2.8	2.7	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sensor air
103K4.04	Containment	2.5	3.2	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Personnel access hatch and emergency access hatch

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001K2.01	Control Rod Drive	3.5	3.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	One-line diagram of power supply to M/G sets.
002K5.14	Reactor Coolant	3.7	4.2	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Consequences of forced circulation loss
011K4.03	Pressurizer Level Control	2.6	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Density compensation of PZR level
016A2.01	Non-nuclear Instrumentation	3.0	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Detector failure
035K6.01	Steam Generator	3.2	3.6	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	MSIVs
041K1.02	Steam Dump/Turbine Bypass Control	2.7	2.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	S/G level
045G2.4.31	Main Turbine Generator	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of annunciators alarms, indications or response procedures
071A1.06	Waste Gas Disposal	2.5	2.8	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Ventilation system
079A4.01	Station Air	2.7	2.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Cross-tie valves with IAS
086K3.01	Fire Protection	2.7	3.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Shutdown capability with redundant equipment

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.2	Conduct of operations	4.1	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operator responsibilities during all modes of plant operation.
G2.1.29	Conduct of operations	4.1	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.
G2.1.31	Conduct of operations	4.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
G2.2.35	Equipment Control	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine Technical Specification Mode of Operation
G2.2.37	Equipment Control	3.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine operability and/or availability of safety related equipment
G2.3.11	Radiation Control	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to control radiation releases.
G2.3.13	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety procedures pertaining to licensed operator duties
G2.4.31	Emergency Procedures/Plans	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of annunciators alarms, indications or response procedures
G2.4.34	Emergency Procedures/Plans	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects
G2.4.39	Emergency Procedures/Plans	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the RO's responsibilities in emergency plan implementation.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EG2.4.34	Reactor Trip - Stabilization - Recovery / 1	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects
011EG2.4.21	Large Break LOCA / 3	4.0	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the parameters and logic used to assess the status of safety functions
025AA2.04	Loss of RHR System / 4	3.3	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Location and isolability of leaks
027AA2.01	Pressurizer Pressure Control System Malfunction / 3	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Conditions which will cause an increase in PZR level
056AG2.1.19	Loss of Off-site Power / 6	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
062AA2.03	Loss of Nuclear Svc Water / 4	2.6	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
059AA2.03	Accidental Liquid RadWaste Rel. / 9	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Failure modes, their symptoms and the causes of misleading indications on a radioactive-liquid monitor
we08EG2.4.21	RCS Overcooling - PTS / 4	4.0	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the parameters and logic used to assess the status of safety functions
WE13EA2.2	Steam Generator Over-pressure / 4	3.0	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.
we16EG2.4.30	High Containment Radiation / 9	2.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of events related to system operations/status that must be reported to internal orginizations or outside agencies.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
012A2.01	Reactor Protection	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Faulty bistable operation
039G2.4.11	Main and Reheat Steam	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
063A2.02	DC Electrical Distribution	2.3	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of ventilation during battery charging
076A2.01	Service Water	3.5	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of SWS
103G2.4.18	Containment	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the specific bases for EOPs.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
028G2.2.40	Hydrogen Recombiner and Purge Control	3.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to apply technical specifications for a system.
072A2.03	Area Radiation Monitoring	2.7	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Blown power-supply fuses
086A2.01	Fire Protection	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Manual shutdown of the FPS

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.3	Conduct of operations	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of shift or short term relief turnover practices.
G2.1.4	Conduct of operations	3.3	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license statur, 10CFR55 etc.
G2.2.25	Equipment Control	3.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
G2.2.38	Equipment Control	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of conditions and limitations in the facility license.
G2.3.12	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety principles pertaining to licensed operator duties
G2.3.14	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities
G2.4.37	Emergency Procedures/Plans	3.0	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the lines of authority during implamentation of an emergency plan.

Facility: VC SUMMER	Date of Examination: **9/12/2011**
Examination Level (circle one): $\boxed{\text{RO}}$ / SRO	Operating Test Number:

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (A1-a)	D	**RO/SRO Common** JPA-081A Manual leak rate G2.1.7 Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.
Conduct of Operations (A1-b)	M	Modify JPA-006 Reactivity management sheet JPA-006B G2.1.43 (4.1/4.3) Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.
Equipment Control (A2)	D	JPA-025 Create tagout G2.2.13 (4.1/4.3) Knowledge of tagging and clearance procedures
Radiation Control (A3)	M	**RO/SRO Common** Modify JPA-083 Apply facility ALARA principles to an emergency situation in an area with a high dose rate and airborne radiation JPA-083A G2.3.12 (3.2/3.7) Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirement, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.
Emergency Plan (A4)		Not chosen for RO

NOTE: All items (5 total) are required for SROs.

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

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JPM SUMMARY STATEMENTS

CONDUCT OF OPERATIONS (A1-a): Calculates leak rate using system data provided since IPCS is out of service. Detects that unidentified leakage exceeds the TS limit.

CONDUCT OF OPERATIONS (A1-b): Completes OAP-100.6, Attachment IA, Reactivity Control Parameters, consistent with the attachment included with this JPM. Tolerance will generally only be given for rounding; however, each case must be evaluated on an individual basis.

EQUIPMENT CONTROL (A2): 'B' MDEFP is tagged out IAW SAP-201. The suction and discharge valves are tagged closed, pump casing drains and vents are tagged open, the motor is tagged out, and the correct sequence is identified for tagging.

RADIATION CONTROL (A3): Compare four options to conduct work in a high radiation area with airborne activity due to a LOCA outside of containment.

EMERGENCY PLAN (A4): Not selected for RO exam

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Facility: VC SUMMER	Date of Examination: **9/12/2011**
Examination Level (circle one): RO / SRO	Operating Test Number:

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations (A1-a)	D	**RO/SRO Common** JPA-081A Manual leak rate G2.1.7 (4.4/4.7) Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.
Conduct of Operations (A1-b)	D	JPA-009 Shift manning. G2.1.5 (2.9*/3.9) Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.
Equipment Control (A2)	M	JPA-025A REVIEW TAGOUT FOR "B" MDEFP G2.2.13 (4.1/4.3) Knowledge of tagging and clearance procedures
Radiation Control (A3)	M	**RO/SRO Common** Modify JPA-083 Apply facility ALARA principles to an emergency situation in an area with a high dose rate and airborne radiation JPA-083A(R 1) G2.3.12 (3.2/3.7) Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirement, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.
Emergency Plan (A4)	D	JPA-020 Given a set of conditions determines the EAL. G2.4.41 (2.9/4.6): Knowledge of the emergency action level thresholds and classifications.

NOTE: All items (5 total) are required for SROs.

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

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JPM SUMMARY STATEMENTS

CONDUCT OF OPERATIONS (A1-a): Calculates leak rate using system data provided since IPCS is out of service. Detects that unidentified leakage exceeds the TS limit.

CONDUCT OF OPERATIONS (A1-b): Determines actions necessary to maintain shift staffing. Update JPM for new fatigue rule and EmpCenter

EQUIPMENT CONTROL (A2): Reviews a manual danger tag for errors. 'B' MDEFP is tagged out IAW SAP-201. The suction and discharge valves are tagged closed, pump casing drains and vents are tagged open, the motor is tagged out, and the correct sequence is identified for tagging.

RADIATION CONTROL (A3): Compare two options to conduct work in a high radiation area with airborne activity due to a LOCA outside of containment.

EMERGENCY PLAN (A4): Event properly classified as a SITE AREA EMERGENCY due to a Loss or Potential Loss of 2 (two) fission product barriers (RCS by D.2 or D.3 and Containment by D.3 or D.4). This is a time critical JPM and the ENF form must be completed within 15 minutes after the emergency condition is determined.

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Facility: VC Summer		Date of Examination: 9/12/2011	
Exam Level (circle one): RO / SRO(I) / SRO(U)		Operating Test No.:	
Control Room Systems (8 for RO; 7 for SRO-I 2 or 3 for SRO-U)			
System / JPM Title		Type Code*	Safety Function
a	APE 069 (JPSF-045B) Modify Ensure containment isolation (EOP-1.0)	A,M,S,EN	5
b.	System 015 (JPS-158) Monitor source range and enable audio count rate (SOP-404)	N,L,S	7
c.	APE 003 (JPSF-012A) Dropped Rod Recovery (AOP-403.6)	A,D,S	1
d.	EPE 011 (JPS-002A) Transfer to Hot Leg Recirculation (EOP-2.3)	D,S	2
e.	EPE 038 (JPSF-007) Depressurize RCS to < Ruptured Steam Generator pressure (EOP-4.0)	A,D,S	3
f.	EPE 015/017 (JPS-013) Respond to a #1 Seal Failure (AOP-101.2)	D,S	4P
g.	E05 (JPS-149A) Modify JPS149 Respond to steam generator overpressure (EOP-15.3)	M,S	4S
h.	System 062 (JPSF-160) Respond to electrical grid issues (AOP-301.1)	A,N,S	6
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)			
i.	APE 068 (JPPF-049 for RO) Evacuation of control room (AOP-600.1)	A,D,E	4
j.	APE 067 (JPP-205) Cross train connection of swing battery charger (FEP-2.0)	D,E,R	6
k.	APE 025 (JPP-408) Align Spent Fuel Cooling Loop B to return Refueling Cavity water to the RWST (AOP-115.4)	N,E,R	8

DRAFT

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

VC SUMMER 2011 NRC JPM SUMMARY

a. Take actions to ensure containment isolation in accordance with EOP-1.0, *REACTOR TRIP/SAFETY INJECTION ACTUATION*, Attachment 3. The applicant will identify that containment integrity is not intact due to two valves on two penetrations not being closed. This leads to the alternate path for this JPM. The applicant attempts to initiate a phase A or close one of the valves from the MCB and one valve closes isolating one of the penetrations. The other penetration will not close from the MCB and the applicant sends a local operator to close a backup valve. This JPM will be modified from one in the bank to change the valves involved and increase the number of valves.

b. Monitor source range counts monitoring in accordance with SOP-404, *EXCORE NUCLEAR INSTRUMENTATION SYSTEM*, Section IV.D, *SOURCE RANGE COUNTS MONITORING*. Count rates are monitored to ensure they are stable. IPCS will be available for this determination. I&C is called to calibrate alarms. Time compression is used for calibration. After calibration, the high flux at shutdown alarms are instated and the audio count rate is enabled. This JPM is new.

c. Take actions to recover a dropped control rod in accordance with AOP-403.5, *DROPPED CONTROL ROD*. The applicant will assume the shift with a dropped rod. On recovery the rod will become stuck, requiring entry into AOP-403.4, *FAILURE OF CONTROL RODS TO MOVE*, with an immediate action to put rods in Manual. A second rod will drop requiring a manual reactor trip. Both the stuck rod and the second rod dropping makes this JPM alternate path.

d. Take actions to transfer from cold leg recirculation to hot leg recirculation in accordance with EOP-2.3, *TRANSFER TO HOT LEG RECIRCULATION*, The applicant will assume the shift with cold leg recirculation in service for ~8 hours. The applicant will transfer from cold to hot leg recirculation without causing the charging pumps to be deadheaded or run out. This JPM is not considered alternate path even though the right hand column is used in the EOP because the right hand side will always be used to properly align the C pump to the correct train.

e. Take actions to depressurize the RCS to less than the pressure of the ruptured steam generator in accordance with EOP-4.0, *STEAM GENERATOR TUBE RUPTURE*. The applicant will open the pressurizer spray valve to depressurize. On reaching a termination setpoint the applicant will attempt to close the spray valve, but it will stick open. This leads to the alternate path for this JPM. In order to stop the depressurization, the applicant will have to secure the 'A' RCP.

f. Take actions to secure the RCP due to a #1 Seal Failure in accordance with AOP-101.2, *REACTOR COOLANT PUMP SEAL FAILURE*. The applicant takes the shift and is instructed to respond to plant conditions. A #1 seal failure occurs. The applicant diagnoses the seal failure and responds. The reactor is tripped. 'A' RCP is secured. PVT-8141A closed between 3 and 5 minutes of securing of 'A' RCP.

g. Take actions to respond to an overpressure condition in a steam generator in accordance with EOP-15.3, *RESPONSE TO LOSS OF NORMAL STEAM RELEASE CAPABILITIES*. An inadvertent main steam line isolation occurred. In addition, the PORV for one of the steam generators fails to open. The applicant is directed to reduce steam generator pressure. The applicant will detect which steam generator is affected. The applicant will lower pressure using the condenser steam dumps by opening the main steam isolation bypass valves. Modified from a JPM in the bank to place applicant in EOP-15.3 instead of EOP-15.1.

h. Take actions to respond to electrical grid issues in accordance with AOP-301.1, *RESPONSE TO ELECTRICAL GRID ISSUES*. The applicant will monitor check to see that a runback is not required. Then monitor turbine bearing vibrations and reactive load. Finally will investigate the condition of 1DA and 1DB. This sets up the alternate path for this JPM. 1DB voltage will be too low and the applicant will start the emergency diesel and have it tie on by opening the normal incoming breaker to 1DB. This JPM is new.

i. Take actions necessary after evacuation of the control room in accordance with AOP-600.1, *CONTROL ROOM EVACUATION*. Due to bomb threat the control room is evacuated without any equipment tripped from the MCB. RO candidates will perform the actions of the BOP. The alternate path for the RO is that the A RCP is tripped and so either B or C RCP will have to be left running.

j. Take actions to cross-train the battery charger in accordance with FEP-2.0, *TRAIN A PLANT SHUTDOWN TO HOT STANDBY DUE TO FIRE*, Enclosure K. The swing battery charger will be aligned to cross-train AC power from "A" Train to DC power of "B" Train to support equipment operation.

k. Take actions to align Spent Fuel Cooling Loop B to return Refueling Cavity water to the RWST in accordance with AOP-115.4, *LOSS OF RHR WHILE REFUELING*, Attachment I, *REFUELING CAVITY LEVEL CONTROL WITH SPENT FUEL GATE IN*. Applicant will establish a return of water to the RWST so that spent fuel can be cooled and level can be controlled in the refueling cavity as RHR is returned to service. This is a new JPM.

Facility: VC Summer		Date of Examination: 9/12/2011	
Exam Level (circle one): RO / SRO(I) / SRO(U)		Operating Test No.:	

Control Room Systems (8 for RO; 7 for SRO-I 2 or 3 for SRO-U)

	System / JPM Title	Type Code*	Safety Function
a	APE 069 (JPSF-045B) Modify Ensure containment isolation (EOP-1.0)	A,M,S,EN	5
b.	System 015 (JPS-158) Monitor source range and enable audio count rate (SOP-404)	N,L,S	7
c.			
d.			
e.			
f.			
g.			
h.			

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

i.	APE 068 (JPSF-044 for SRO) Evacuation of control room (AOP-600.1)	A,D,E	4
j.	APE 067 (JPP-205) Cross train connection of swing battery charger (FEP-2.0)	D,E,R	6
k.	APE 025 (JPP-???) Align Spent Fuel Cooling Loop B to return Refueling Cavity water to the RWST (AOP-115.4)	N,E,R	8

DRAFT

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

VC SUMMER 2011 NRC JPM SUMMARY

a. Take actions to ensure containment isolation in accordance with EOP-1.0, *REACTOR TRIP/SAFETY INJECTION ACTUATION*, Attachment 3. The applicant will identify that containment integrity is not intact due to two valves on two penetrations not being closed. This leads to the alternate path for this JPM. The applicant attempts to initiate a phase A or close one of the valves from the MCB and one valve closes isolating one of the penetrations. The other penetration will not close from the MCB and the applicant sends a local operator to close a backup valve. This JPM will be modified from one in the bank to change the valves involved and increase the number of valves.

b. Monitor source range counts monitoring in accordance with SOP-404, *EXCORE NUCLEAR INSTRUMENTATION SYSTEM,* Section IV.D, *SOURCE RANGE COUNTS MONITORING*. Count rates are monitored to ensure they are stable. IPCS will be available for this determination. I&C is called to calibrate alarms. Time compression is used for calibration. After calibration, the high flux at shutdown alarms are instated and the audio count rate is enabled. This JPM is new.

c. Not selected for SRO.

d. Not selected for SRO.

e. Not selected for SRO.

f. Not selected for SRO.

g. Not selected for SRO.

h. Not selected for SRO.

i. Take actions necessary after evacuation of the control room in accordance with AOP-600.1, *CONTROL ROOM EVACUATION*. Due to bomb threat the control room is evacuated without any equipment tripped from the MCB. SRO candidates will perform the actions of the CRS. The alternate path for the SRO is determining that emergency boration is required due to two stuck rods.

j. Take actions to cross-train the battery charger in accordance with FEP-2.0, *TRAIN A PLANT SHUTDOWN TO HOT STANDBY DUE TO FIRE*, Enclosure K. The swing battery charger will be aligned to cross-train AC power from "A" Train to DC power of "B" Train to support equipment operation.

k. Take actions to align Spent Fuel Cooling Loop B to return Refueling Cavity water to the RWST in accordance with AOP-115.4, *LOSS OF RHR WHILE REFUELING*, Attachment I, *REFUELING CAVITY LEVEL CONTROL WITH SPENT FUEL GATE IN*. Applicant will establish a return of water to the RWST so that spent fuel can be cooled and level can be controlled in the refueling cavity as RHR is returned to service. This is a new JPM.

1. 004K4.07 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/6/11/NO
Given the following plant conditions:

- 100% power
- VCT level transmitter LT-115 has failed **HIGH**

Which ONE (1) of the following statements identifies the response of functions associated with the Volume Control Tank (VCT)?

A.✓ Automatic emergency makeup from the RWST is disabled.

B. Automatic emergency makeup from the RWST will commence.

C. The VCT will commence auto makeup at 20% actual VCT level.

D. Letdown Divert Valve, LCV-115A, will remain aligned to the VCT.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

CVCS87

DISTRACTOR ANALYSIS:

A. CORRECT per AB-3 Figure AB3.5. (LT-112 would attempt to start Emergency Water Supply from the RWST at 5% actual level but the failure of LT-115 would prevent making up the 2/2 coincidence for suction transfer to the RWST.

B. Plausible because LT-115 does control automatic makeup.

Incorrect for a failure *high.*

C. Plausible because automatic makeup does commence at 20%,

Incorrect with LT-115% failed to 100%

D. Plausible because LT-115 does control divert valve 115A.

Incorrect because will divert to the Holdup Tank for LT-115 failed > 80% level.

K/A: 004 Chemical and Volume Control K4.07 Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following: Water supplies

K/A match; K/A is met because operator must determine the effect of the loss of one of the two Volume Control Tank level transmitters that automatically supply Charging/SI pump suctions with water supply from the Refueling Water Storage Tank if Volume Control Tank level is lost.

Selection criteria; Only two bank questions were tied to this KA. (The other was MAKEUP WATER 8 concerning hear tracing on RMWST.) This question selected for operational relevance and cognitive level.

Tier: 2 **Group:** 1
Importance Rating: RO 3.0
Technical Reference: Drawing 1MS-51-032-23-9

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-3-24

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments; Taskmaster Question # 4883

2. 012K6.03 003/NEW//HIGHER//RO/SUMMER/1/18/11/NO

Given the following plant conditions:

- 100% power
- Flow in the RCS loop "A" drops to 75%.

Which ONE (1) of the following permissive bistables, if in the wrong condition for current plant status, would **prevent** an automatic reactor trip?

A. P-7

B.✓ P-8

C. P-9

D. P-12

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011 wdb 4/8/11.

Rev. 1 Submitted by Matthew R. Bender
Changed stem from "Which ONE (1) of the following **failures** would **prevent** an automatic reactor trip?" to "Which ONE (1) of the following permissive bistables, if in the wrong condition for current plant status, would **prevent** an automatic reactor trip?"
Removed status of lights and false from choices per review comment.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible, P-7 would block the anticipatory 2-loop loss of flow trips on UV and UF that are present.

Incorrect because the single loop loss of flow > P-8 would still operate since it is not blocked by P-7.

B. CORRECT the single loop loss of flow signal is the only one present .

C. Plausible because P-9 is a permissive that exists and is related to power.

Incorrect because P-9 is 50% power and is used to cause a reactor trip on a turbine trip above 50% power.

D. Plausible because P-12 is a permissive that exists.

Incorrect because P-12 is LO RCS Tave of 552 and is not used to block a loss of flow trip.

K/A: 012 Reactor Protection K6.03 Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Trip logic circuits

K/A Match: K/A is met because candidate must determine what affect a failure of the permissive inputs to the trip logic will have on the ability of the RPS to generate a trip.

Selection criteria; two bank questions (RPS 166 and 169) were tied to this K/A but neither actually dealt with "failures". New question written to precisely match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.1
Technical Reference: IC-9
Proposed references to be provided to applicants during examination: None

Learning Objective: IC-9-17

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

3. 011K4.03 002/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- 100% power.
- Pressurizer Level Control Channel Selector switch is in the "459+460" position

Which ONE (1) of the choices below identifies the following:

1) The level channel that will cause a reactor trip with no operator action if it fails high **OR** low.

2) Whether LT-459 and LT-460 serve as Reactor Trip protection channels.

A.✓ 1) LT-459
2) LT-459 and LT-460 also serve as Reactor Trip protection channels.

B. 1) LT-459
2) LT-459 and LT-460 ONLY serve as pressurizer level control channels.

C. 1) LT-460
2) LT-459 and LT-460 also serve as Reactor Trip protection channels.

D. 1) LT-460
2) LT-459 and LT-460 ONLY serve as pressurizer level control channels.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. Per IC-3, PRESSURIZER PRESSURE AND LEVEL CONTROL, page 45 and 46. If LT-459 fails high it will throttle FCV-122 to minimum flow. Actual level will drop and at 17% letdown will isolate. Pressurizer level will then increase until the reactor trips on high pressurizer level. If LT-459 fails low then FCV-122 will open and the reactor will trip on high pressurizer level on the other two channels. The protection channels are 459, 460, and 461.

B. Plausible because the first part is correct and serving only as controlling channels is plausible because that is typical RPS design. Pressurizer pressure as an example uses PT-444 and 445 to control pressure, but uses PT-455, 456, and 457 to cause a reactor trip and safety injection.

   Incorrect because LT-459 and 460 also serve as protection channels.

C. Plausible LT-460 will cause a reactor trip if it fails low by isolating letdown and the second part is correct.

   Incorrect because when LT-460 fails high the only response is that one bistable for a high pressurizer reactor trip is actuated.

D. Plausible LT-460 will cause a reactor trip if it fails low by isolating letdown and serving only as controlling channels is plausible because that is typical RPS design. Pressurizer pressure as an example uses PT-444 and 445 to control pressure, but uses PT-455, 456, and 457 to cause a reactor trip and safety injection.

   Incorrect because when LT-460 fails high the only response is that one bistable for a high pressurizer reactor trip is actuated and LT-459 and 460 are also used as protection channels.

K/A: 011 Pressurizer Level Control K4.05 Knowledge of PZR LCS design feature(s) and/or interlock(s) which provide for the following: PZR level inputs to RPS

K/A Match: the K/A is met because the candidate must know which pressurizer level transmitters input into the RPS and the effects on an interlock if failed.

Selection criteria; New

Tier: 2 **Group:** 2
Importance Rating: RO 3.7
Technical Reference: IC-03 PRESSURIZER PRESSURE AND LEVEL CONTROL

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-3-22

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

4. 016A2.01 001/MOD/VCS CLOSED/HIGHER//RO/SUMMER//NO

Given the following plant conditions:

0800
- RCS T_{avg} control channels were initially indicating as follows:
  "A" loop - 587.2°F
  "B" loop - 587.0°F
  "C" loop - 586.8°F

0810
- Loop A T_{avg} failed **HIGH** (624°F)
- Loop A ΔT failed **LOW** (0°F)

Which ONE (1) of the following statements identifies the temperature detector failure in that loop that would cause these indications and whether operators will place control rods in manual at time of failure?

A. One Loop A T_{hot} failed **HIGH**; place control rods in MANUAL

B. Loop A T_{cold} failed **HIGH**; place control rods in MANUAL

C. One Loop A T_{hot} failed **HIGH**; leave control rods in AUTO

D✓ Loop A T_{cold} failed **HIGH**; leave control rods in AUTO

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Significant modification of RCS TEMP INDICATION 8

Rev 1 (wdb 1/27/11) placed in standard format. Added actions to meet second half ("and use procedures to control or mitigate") of K/A. This also removed two "failed low" choices of original question, which were less plausible given T_{avg} reading HIGH.

Rev. 2 Submitted by Matthew R. Bender
Clean up stem to make more clear timeline for the failure and to make clear asking about rods. Removed tripping bistables from actions (was in all choices).

Selected for use and verified by (name & date), Patrick Leary 6/14/10

DISTRACTOR ANALYSIS:

A. Plausible because direction of T_{avg} failure is correct and second part would be right if the *output* of the median select circuit failed, causing rod motion.

Incorrect because the T_{hot} averaging circuit adds the three T_{hot}s together and divides by 3 so that (630 + 630 +618)/3 = 626°F average Thot and (556 + 626)/2 = 591°F not 624°F.

B. Plausible because first part is right and second part would be right if the *output* of the median select circuit failed, causing rod motion.

Incorrect because rod motion would not occur due to median select circuit.

C. Plausible because failure would affect T_{avg} and ΔT and T_{avg} would increase; also, second part is right.

Incorrect because direction of change of ΔT is wrong.

D. CORRECT. (630 + 618)/2 = 624°F. ΔT = 618 - 630 = -12°F (shows as zero, bottom of scale).

K/A: 016 Non-nuclear instrumentation A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure

K/A Match: the K/A is met because the candidate must analyze the effect of a non-nuclear (RCS temperature) detector failure on the main control board indications and decide which AOPs should be entered to mitigate the effects of the malfunction.

Selection criteria; Two existing bank questions, RCS TEMP INDICATION 8 and ROD CONTROL 93 were tied to this K/A. The rod control question overlapped with several simulator events so the other question was selected as being more specific to "detector failure".

Tier: 2 **Group:** 2
Importance Rating: RO 3.0
Technical Reference: IC-6, AOP-401.2 PROTECTION CHANNEL RCS LOOP RTD FAILURE

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-6-17

10 CFR Part 55 Content: 41(b)6

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

5. 000054G2.1.31 003/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- 100% power
- A feed line rupture occurs just downstream of PVT-488, SG B FWF
- A Reactor Trip occurs

Which ONE (1) of the following will be the FIRST indication that informs the operator that a feedwater isolation signal should have closed PVT-488?

A.✓ XCP 615, 1-2, RCS TAVG LO

B. XCP 615, 1-3, RCS TAVG LO-LO

C. Permissive Indicator Channel II LP B P-12

D. STM/FW MISMATCH indicator CHAN IV SG B FB-488A

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011 RJ

Rev. 1 Submitted by MRB based on 2nd validation. Changed steam from "that PVT-488 should be in the closed position." to "that a feedwater isolation signal should have closed PVT-488" to make it clear that it is the feedwater isolation signal that is desired not the first indication during the entire accident.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. Per IC-9, REACTOR PROTECTION AND SAFEGUARDS ACTUATION SYSTEM, page58 a feedwater isolation signal is generated with P-4 (reactor trip breakers open) with low Tavg (2 of 3 RCS loops) 564°F.

B. Plausible because this is another Tavg setpoint and is used in the protection scheme. It is used to cause a steamline isolation with high steam flow.

   Incorrect because this alarm will come in at 552°F and so the feedwater isolation would have already occured.

C. Plausible because P-12 is a setpoint for Tavg 552°F and is used as a signal for steamline isolation.

   Incorrect because this will come in at 552°F and the feedwater isolation should come in at 564°F.

D. Plausible because this signal will cause a reactor trip with a steam generator low level (35%) and a feedbreak has occured so this bistable will be picked up.

   Incorrect because this bistable will cause a reactor trip but will not cause a feedwater isolation signal.

K/A: 000054 Loss of Main Feedwater G2.1.31 Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.

K/A Match: the K/A is met because the candidate must determine the desired bistables/alarms that will indicate when feedwater should be isolated during a loss of feedwater event.

Selection criteria; New question.

Tier: 1 **Group:** 1
Importance Rating: RO 4.6
Technical Reference: IC-9 REACTOR PROTECTION AND SAFEGUARDS ACTUATION SYSTEM TB-7 FEEDWATER SYSTEM.

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-9-34, TB-7-15

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

6. 000007EK2.03 003/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- 8% power
- Intermediate Range N-36 failed high.

Which ONE (1) of the following indicates the expected indications for Reactor Trip Breakers and of first out window XCP-626, pt 3-6, IR FLUX HI, ten (10) minutes after the failure?

A. Trip breakers will indicate shut.
XCP-626 pt 3-6, IR FLUX HI will be dim.

B. Trip breakers will indicate shut.
XCP-626 pt 3-6, IR FLUX HI will be flashing at the same rate as other alarms.

C. Trip breakers will indicate open.
XCP-626 pt 3-6, IR FLUX HI will be flashing at the same rate as other alarms.

D.✓ Trip breakers will indicate open.
XCP-626 pt 3-6, IR FLUX HI will be flashing at a faster rate than other alarms.

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.

Rev. 1 Submitted by Matthew R. Bender added time of 10 minutues after failure to stem to indicate that do not want immediate response.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this would be true if the failure occured after the IR high flux trip was blocked.

Incorrect because below 10% power the IR high flux trip is not blocked.

B. Plausible because this would be true if the first out panel indicated when the setpoint was reached, but did not take into account the blocking circuit and the trip was blocked at this power level.

Incorrect because the trip is not blocked at this power level and if the trip was blocked the first out light would not come in even after the NI failed.

C. Plausible because every alarm panel but the first out panel does not have the capability to cause one alarm to blink at a different rate because it came in first.

Incorrect because the red first out panel has the ability to cause the first alarm recieved on the panel to blink at a different rate than the other alarms.

D. CORRECT. The IR high flux trip is not blocked at this power level and according to the DBD for the Main Control Board (MCB) on page 3.7-6, "The "first-out" alarm allows for faster fault analysis by informing the operator of the trip alarm which initiated subsequent alarms. The "first-out" annunciator panel contains alarms associated with causing a reactor trip. An intermittent fast flash of the alarm window identifies the first to alarm window, SS-224-208, Sht. 2, (Refs. 77 and 98)."

K/A: 000007 Reactor Trip-Stabilization-Recovery EK2.03 Knowledge of the interrelations between a reactor trip and the following : Reactor trip status panel

K/A Match: KA is met because the stem gives a condition that would cause a specific reactor trip and the canidate is required to know the interrelation of how the reactor trip status panel will appear in that specific trip case.

Selection criteria; New question created, no bank question correctly matched KA.

Tier: 1 **Group:** 1
Importance Rating: RO 3.5
Technical Reference: DBD MCB, IC-8 Nuclear Instrumentation

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-8-28

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments;

7. 000032AA2.03 003/MOD//KNOWLEDGE//RO/SUMMER/12/20/10/NO

Which ONE (1) of the below choices describes the reactor power at which the N31 and N32 Source Range trips are blocked during a startup and the status of detector high voltage after they are blocked?

A. Above 10^5 cps in the source range, high voltage is turned off

B. Above 10^5 cps in the source range, high voltage remains energized

C. Above 7.5 x 10^{-6}% in the intermediate range, high voltage is turned off

D.✓ Above 7.5 x 10^{-6}% in the intermediate range, high voltage remains energized

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (Nuc Inst System 8)

New question MRB. Significantly modified from Nuc Inst System 8. Second half of this question is different than that question (which was when does source range get automatically blocked)
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this is the hi flux source range trip and the old detectors and N33 have power removed at power.

Incorrect because the trip is blocked above 7.5 E-6 on the intermediate range and power is left to N31 and N32 at all powers.

B. Plausible because this is the source range high flux trip setpoint and the second half is correct.

Incorrect because the source range high flux trip is blocked above 7.5E-6 because the trip occurs at 1E5 cps on the source range.

C. Plausible because the first part is correct and the old BF3 detectors had power removed and N-33 is still a BF3 detector and so has power removed.

Incorrect because with the new Gamma-Metric detectors high voltage power is left to N31 and N32 at all power levels.

D. CORRECT. Per GOP-3 step 3.12 the source range high flux is blocked above 7.5E-6 prior to source range counts going above 1E5 cps on the source range, but power is not removed from the detector.

K/A: 000032 Loss of Source Range NI AA2.03 Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Expected values of source range indication when high voltage is automatically removed.

K/A Match: The K/A is met because the removal of high voltage would effectively remove the source range trips at high power and so the blocking of the source range fulfills the same function as that the automatic removal of high volatage used to do. KA match discussed with lead examiner.

Selection criteria; No bank questions exactly matched the K/A (the K/A is for the classic Westinghouse BF3 detectors that had to be turned off at power; VCS has installed the GammaMetrics fission chamber source and intermediate ranges that stay energized at all times). New question written to match K/A

Tier: 1 **Group:** 2
Importance Rating: RO 2.8
Technical Reference: GOP-3, REACTOR STARTUP FROM HOT STANDBY TO STARTUP (MODE 3 TO MODE 2)

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-8-28, -32

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

8. 000029EK2.06 004/NEW//HIGHER//RO/SUMMER/9/29/10/NO

Given the following plant conditions:

- 100% power
- STP 345.037, SOLID STATE PROTECTION SYSTEM ACTUATION LOGIC AND MASTER RELAY TRAIN A, is in progress
- Reactor trip breaker RTA is being tested
- During the testing both trains of SSPS generate valid reactor trip signals.

Which ONE (1) of the following choices identifies the minimum number of malfunctions that would cause a failure of an **automatic** reactor trip in the conditions shown?
(RT = Reactor Trip Breaker, BY = bypass breaker)

REFERENCE PROVIDED

A. Inoperable Shunt trip coils on RTA, RTB, and BYA

B. Inoperable Undervoltage trip coils on RTB and BYA

C. Inoperable Undervoltage trip coils on both RTA and RTB and an inoperable shunt trip coil on BYA

D✓ Inoperable Undervoltage trip coils on both RTB and BYA and an inoperable shunt trip coil on RTB.

QUESTION USAGE:

2011 RO NRC exam

QUESTION HISTORY:

New for 2011 wdb.

Rev. 1 (wdb 3/29/11) added names of breakers.

Rev. 2 (wdb 4/4/11) added common breaker designations per WK feedback
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

(RT = Reactor Trip Breaker, BYB = bypass breaker, UV =undervoltage)

A. Plausible because the shunt trip coil on the RTB opens on an auto or manual trip and on the BYB only for manual trips.

Incorrect because the UV coils on the RTB and BYB breakers would open both breakers.

B. Plausible because, the UV coils on both breakers would operate for an auto trip. By the original design (like Salem) this would have prevented an auto trip

Incorrect because the Shunt Trip Auxiliary relay on the "B" RTB would open that breaker, tripping the reactor.

C. Plausible because this combination would keep the "A" BYB closed against both manual and auto trip attempts.

Incorrect because the Shunt Trip Auxiliary relay on the "B" RTB would open that breaker, tripping the reactor.

D. CORRECT. The candidate must realize that the "A" BYB would be racked in and the "A" RTA would be racked out to the TEST postion for this STP. Only the RTBs have a Shunt Trip Auxiliary relay that activates the shunt trip coil on a loss of 48V DC from the SSPS. The UV coil failure prevent the "A" BYB from opening and the combination of the UV and shunt coil failures prevents the "B" RTB from opening.

K/A: 000029 EK2.06 Knowledge of the interrelations between the following and ATWS: Breakers, relays, and disconnects

K/A Match: K/A is met because the candidate must determine breaker operability based on presence of Shunt Trip Auxiliary relay in the RTB only (not used for BYB).

Selection criteria; new question written because only Rod Control 59 was close to the KA, and

it only addressed general operation (auto or manual) not the role of specific coils and relays in the RTB vs. the BYB.

Tier: 1 Group: 1
Importance Rating: RO 2.9 SRO
Technical Reference: STP-345.037

Proposed references to be provided to applicants during examination: Provide screen print of simulator in current condition

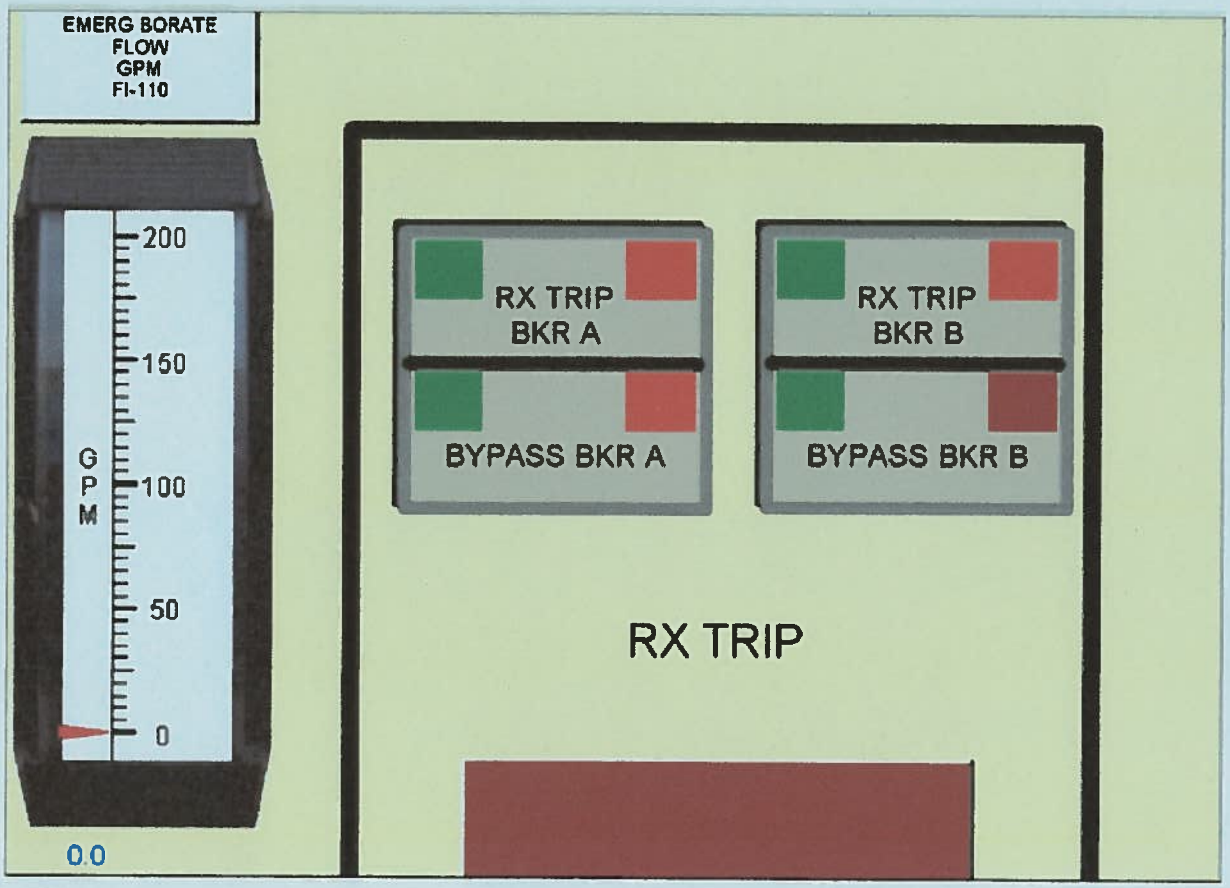
Learning Objective: IC-15-04

10 CFR Part 55 Content: 41(b)6

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;



9. 010A4.01 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/18/11/NO

Given the following:

- The plant is at 100% power, steady state conditions
- RCS pressure at 2235 psig
- All systems are in automatic.

If the NROATC raises the pressurizer pressure master controller setpoint (adjusts the potentiometer) by 40 psig, which ONE (1) of the following describes the response of the pressure control system components after ONE (1) minute?

(Assume a step change in the controller setpoint.)

	B/U Heaters (Group 2)	Spray Valves
A.✓	ON	CLOSED
B.	OFF	CLOSED
C.	OFF	OPEN
D.	ON	OPEN

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (AS PZR PRESS CNTRL SYS 13)

Rev. 1: (WRQ - 01/23/08) Added "steady-state" to stem. In stem, changed "status" to "short-term response." Changed answer from C to A (see DISTRACTOR ANALYSIS). Added headers in Feedback section. Added DISTRACTOR ANALYSIS.

Rev. 2 (wdb 3/28/11) changed first choice in D. to ON to remove specific determiner (before, on the right choice had B/U heaters ON.

Rev. 1 Submitted by Matthew R. Bender based on RJ comment.
Removed actions of the control heaters and PORV.
Added 1 minute as the time frame instead of short term.

Rev. 2 Submitted by MRB based on 2nd validation.
Changed stem to indicate B/U Heaters were group 2. Added qualifiying statement "(Assume a step change in the controller setpoint)"
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. Per training handout IC-3: "Master Pressure Controller (PC-444A) - The PI controller that develops the conditioned control signal is called the pressurizer pressure master controller (PC-444A) and is located in the process control racks. With the

master controller in automatic, as selected by PK-444A on the MCB, the reference pressure signal is varied by adjusting a potentiometer dial. The potentiometer is normally set so that in automatic, the pressurizer heaters, spray valves, and PCV-444B control plant pressure at 2235 psig. Variation of the reference setpoint results in automatic control of plant pressure at some value other than 2235 psig." If the operator raised the controller setpoint by 40 psig, the controller would try and control at 2275 psig (it shifts the P_{ref} value up by 40 psig). The heaters and spray valves would immediately sense that actual pressure was below the new desired pressure so heaters would cut on and spray valves would close.

B. Plausible because there is a range just below Pref where the control heaters are increasing current but the backup heaters are not yet on and the spray valves are closed(See Fig. IC-3-9 in NOTES)

Incorrect because the current pressure is more than 25 psig below the new Pref, which will kick the backup heaters on. This persists for a short time since heaters do not change pressure as quickly as spray valves will.

C. Plausible because this would be the condition if Pref were *decreased* by 40 psig.

Incorrect because Pref is now *higher* than actual pressure.

D. Plausible because the B/U Heaters are turned on to force more spray flow in order to equilize boron between the RCS and the pressurizer.

Incorrect because this is not done by adjusting the controller setpoint, but by manually starting the B/U heaters.

K/A: 010 Pressurizer Pressure Control A4.01 Ability to manually operate and/or monitor in the control room: PZR spray valve

K/A Match: the K/A is met because the operator must be able to monitor the operation of the Pressurizer Spray valve after he manually operates the Master Pressure Controller (PK-444)

Selection criteria; only two question in the bank were tied to this K/A. The other question just had pressure change, which addressed less of the "operate" portion of this K/A and led to a lower cognitive level.

Tier: 2 **Group:** 1
Importance Rating: RO 3.7
Technical Reference: IC-3

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-3-14

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments; RT only A. had B/U heaters on. (added to D. also wdb)
WK, TL good question.

10. 063K4.04 002/NEW//KNOWLEDGE//RO/SUMMER/5/4/2011/NO

Given the following plant conditions:

- The "A" Diesel Generator is running in the TEST mode
- The following annunciators are received on XCP-636:
  - DG A LOSS OF DC
- Operators verify that **ALL** DC power has been lost to the diesel

Which ONE (1) of the below choices identifies **if** "A" DG trips automatically or, if not, **how** it can be tripped?

A. Trips automatically.

B.✓ Does not trip automatically, but can be stopped by manipulating the fuel rack ONLY.

C. Does not trip automatically, but can be stopped by manipulating the fuel rack or by pushing the local STOP Pushbutton ONLY.

D. Does not trip automatically, but can be stopped by manipulating the fuel rack or by pushing the local STOP Pushbutton or taking the TEST switch to STOP from the MCB.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

new for 2011 (MRB 5/4/2011)

Rev. 1 Submitted by MRB based on 2nd validation.
Added bullet that ALL DC power was lost to the diesel because alarm can come in with only a partial loss of DC to the DG.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because more trips are available in Test start vs Emergency start (only low lube oil pressure, overspeed, and generator differential will trip the diesel in emergency start.

Incorrect a loss of DC causes a loss of any automatic trip functionality.

B. CORRECT per ARP-004 Panel XCX-5201 pt 1-5. "If Diesel Generator A is running, the following features are lost: 1) The ability to shut down the diesel engine by placing the TEST switch in STOP (MCB) or by depressing the STOP Pushbutton (Local). 2) Diesel Engine protective trips are disabled due to the inability to energize XVX10998A-DG, AIR TO FUEL RACK S/D CYL SOLENOID VALVE....5) To stop the diesel, align the fuel rack to the NO FUEL position by holding the Stop Lever in STOP until the diesel stops rolling.

C. Plausible because if the local switch is in MAINT then this would be right.

Incorrect because the local STOP pushbutton will not work without DC power.

D. Plausible because with DC power all three of these methods would work to shutdown the diesel.

Incorrect because without DC power the only way to shut down the diesel is to use the fuel racks.

K/A: 063 DC Electrical Distribution K4.04 Knowledge of DC electrical system design feature(s) and/or interlock(s) which provide for the following: Trips

K/A Match: the K/A is met because the candidate must determine the effect that a loss of one train of ESF DC has on the ability to trip that train's Emergency Diesel Generator.

Selection criteria; No existing bank question was tied to this K/A. DC ELECT DIST SYSTEM 1 discussed breaker tripping power but had been used on the 2011 RO Audit exam. New question written to match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 2.6
Technical Reference:

Proposed references to be provided to applicants during examination: None

Learning Objective: IB-5-04

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

11. 022K1.01 003/NEW//KNOWLEDGE//RO/SUMMER/5/10/11/NO

Given the following plant conditions:

- A large break LOCA occurred 10 minutes ago.
- All offsite power has been lost (115 and 230 kV).

Which ONE (1) of the choices below completes the following statement:

1) The service water booster pumps automatically start _____________ the Component Cooling Water pumps start.

2) The service water booster pumps are designed to align to the RBCUs after a safety injection because __________________________.

A.✓ after;
the service water booster pumps provide higher pressure to prevent backleakage from the reactor building atmosphere to the environment.

B. before;
the service water booster pumps provide higher pressure to prevent backleakage from the reactor building atmosphere to the environment.

C. after;
the service water booster pumps provide higher pressure to collapse voids in the RBCUs cooling coils.

D. before;
the service water booster pumps provide higher pressure to collapse voids in the RBCUs cooling coils.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.

Rev. 1 Submitted by Matthew R. Bender based on 2nd validation.
Changed from "_____ the RBCU fans started." to "_______ the Component Cooling Water pumps started."
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. Per GS-2 encl. L SWBP starts at 30 seconds, which is after the CCS pumps at 10 seconds. Per IB-1 page 24 "Orifices in the discharge lines from containment ensure the pressure in the Reactor Building cooling units is at a greater pressure (a minimum of 60 psig) than Reactor Building post accident design pressure (53.5 psig). This is higher than the maximum containment atmosphere pressure, and therefore prevents containment atmosphere from entering the Service Water System and precludes the necessity of continuous radiation monitoring of the discharge."

B. Plausible because the second part is correct.

Incorrect since the SWBPs start later.

C. Plausible because the first part is right and void collapse water hammer is a concern in the SW piping to the RB (the elevated piping can drain).

Incorrect since void collapse water hammer is prevented by interlocks on the SWBP discharge and RB to the SW pond valves 8106 and 8107.

D. Plausible because void collapse water hammer is a concern in the SW piping to the RB (the elevated piping can drain).

Incorrect since the SWBPs start later and void collapse water hammer is prevented by interlocks on the SWBP discharge and RB to the SW pond valves 8106 and 8107.

K/A: 022 Containment Cooling K1.01 Knowledge of the physical connections and/or cause/effect relationships between the CCS and the following systems: SWS/cooling system

K/A Match: the K/A is met because the candidate must know the relationship between the SWS and why it is supplying the CCS after an SI.

Selection criteria; New

Tier: 2 **Group:** 1
Importance Rating: RO 3.5
Technical Reference: IB-1, EOP-1.0, SOP-117

Proposed references to be provided to applicants during examination: None

Learning Objective: IB-1-05

10 CFR Part 55 Content: 41(b)9

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

12. 064K1.05 004/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/24/11/NO
Given the following plant conditions:

- A plant trip occurred due to a loss of off-site power, (115KV and 230KV).
- The "A" EDG failed to start automatically and **CANNOT** be started from the Control Room due to faulty wiring.
- An operator has manually depressed XVM10996A-DG DIESEL GEN A MAIN AIR START VALVE A
- "A" EDG has NOT started

Which ONE (1) of the following would <u>prevent</u> the "A" D/G from coming up to speed when the Air Start Valve "A" is manually depressed?

A. The Fuel Oil Accumulator Tank DRY light is lit.

B. The LOCAL/REMOTE/MAINT switch in REMOTE

C. The LOCAL/REMOTE/MAINT switch in MAINTENANCE

D✓ A large rupture on XTK009A, DIESEL GENERATOR A AIR RECIEVER TANK A

QUESTION USAGE:

RO 2011 NRC
2006 NRC RO

QUESTION HISTORY:

(as EMERGENCY DIESEL GEN 13) Rev.1 (dow 9/20/06) added K/A info, feedback, & notes from 2006 NRC RO exam

Rev. 2 Changed correct answer from "Pressure in the "B" D/G air receivers is insufficient." to "One air receiver has a significant puncture." to make it less obvious that it is the correct answer based on Duke comments. Changed stem to ask specifically why did not start from manipulation of air start valve.

Rev. 3 Submitted by MRB based on RT comment.
"Changed barring device is engaged" to "Fuel Oil Accumulator Tank DRY light lit".
OPS review RT
Approved RJ

Rev. 4 (wdb 7/27/11) changed "starting" to "comingup to speed in stem per Robert Justice comment (MAINTENANCE position will prevent Field Flash, which could be considered part of engine start.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the accumulator tank does aid engine start.

Incorrect since the accumulator speeds up starting but the engine still could start with just the electric or motor driven fuel oil pumps.

B. Plausible because the operator might believe that the REMOTE position blocks local actions.

Incorrect since their is no electrical interlock on the pneumatically operated Main Air Start valve that prevents local manual operation of the valve shaft.

C. Plausible because the LOCAL/REMOTE/MAINT switch is used to prevent engine start during maintenance operation.

Incorrect since the switch does not block air to the valve.

D. CORRECT per figure IB5.2; the air tanks are normally cross-connected to supply the design number of EDG start attemps before they must be recharged; therefore a rupture on one tank will bleed down both tanks and prevent rolling the engine. This is not obvious if the candidate thinks the air to each bank is normally split out (either side should be able to star the EDG).

K/A: 064 Emergency Diesel Generator K1.05 Knowledge of the physical connections and/or cause/effect relationships between the ED/G system and the following systems: Starting air system

K/A Match: the K/A is met because the candidate must determine the effect of a Starting air system problem on the Emergency Diesel Generator (failure to start).

Selection criteria; Eight existing bank questions were tied to this K/A. EDG 11 and 124 had inplausible distractors. EDG 20, 49, and 71 were very simple/low cognitive level. EDG 21 had low operational significance and two arguably right answers. EDG 141 addressed only the starting air system, not "relationship with EDG". That left the selected question by elimination.

Tier: 2 **Group:** 1
Importance Rating: RO 3.4
Technical Reference: IB-5, Diesel Generator
Proposed references to be provided to applicants during examination: None

Learning Objective: IB-5-21,-28

10 CFR Part 55 Content: 41(b)8

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

13. W/E10EK3.4 002/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/6/11/NO

Given the following plant conditions:

- 100% power
- ALL Offsite Power (BOP & ESF) is lost.
- Both DG 'A' and 'B' start and restore power to their respective ESF Bus.
- The ESFLSs have been RESET.
- The plant is initiating a natural circulation cooldown in accordance with site procedures.

Which ONE (1) of the following describes the availability of the Pressurizer Control and Backup (BU) Heaters AND the action that is needed to energize them?

A.✓ The BU Heaters ARE available, the Control Heaters are NOT available;

Operate the MCB control switch as necessary.

B. The BU Heaters ARE available, the Control Heaters are NOT available;

Locally close the fused disconnects in back of APN-4106, and then operate the MCB control switch as necessary.

C. The Control Heaters ARE available, the BU Heaters are NOT available;

Operate the MCB control switch as necessary.

D. The Control Heaters ARE available, the BU Heaters are NOT available;

Locally close the fused disconnects in back of APN-4104 and -4105, and then operate the MCB control switch as necessary.

QUESTION USAGE: (as PZR PRESS CNTRL SYS 48)

RO 2011 NRC

QUESTION HISTORY:

PZR PRESS CNTRL SYS 48

DISTRACTOR ANALYSIS:

A. CORRECT According to GS1 (p25, Rev 15), the PZR Control Heaters are powered from APN-4106 which is powered from 7.2 KV Bus 1C, and the PZR Backup Heaters are powered from APN-4104 and 4105, which are powered from 7.2 KV ESF Bus 1DA and 1DB, respectively. Under the stated conditions, ONLY the Backup Heaters are available. According to GS2 (p50-51, Rev 15), when a Blackout occurs on an ESF Bus the ESFLS takes several actions, one of which is the actuation of several Auxiliary Trips and Lockouts. One of these trips and Lockouts is the trip of the feeder breaker (Shown in Table GS2.8) from the 7.2 KV Bus to the PZR BU Heaters (APN 4104 and 4105). According to GS2 (p50), the ESFLS reset switches reset the automatic lockout of non-ESF loads. The stated conditions allow re-closure of the 7.2 KV Bus Feeder Breaker which will re-energize APN-4104 and 4105. According to IC3 (p25-28, Rev 9), the PZR BU Heaters are energized by the operation of a Control Switch on the MCB.

B. Plausible because if additional B/U heater capability is needed, the crew would close fused disconnects in back of APNs.

Incorrect. 1st part correct – See Above. 2nd part wrong – The Control heaters are powered from Bus 1C via APN-4106.

C. Plausible– 2nd part correct.

Incorrect. 1st part wrong

D. This is plausible if operator does NOT know that the trips are reset by the ESFLS on a blackout signal.

Incorrect. B/U heaters are available AND do not have to close feeder breaker to APN-4104 and 4105 first.

K/A: W/E10 Natural Circulation EK3.4 RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facility's license and amendments are not violated.

K/A Match: K/A is met because the candidate must understand his function within the control room team to monitor and control pressurizer heaters to maintain natural circulation.

Selection criteria;

Tier: 1 **Group:** 2
Importance Rating: RO 3.4
Technical Reference: GS1, p25, Rev 15
GS2, p50-51, Rev 15
IC3, p25-28, Rev 9

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-2-06

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

14. 000057AA2.12 001/MOD/VCS CLOSED/HIGHER//RO/SUMMER/12/3/10/NO

Given the following plant conditions:

- The Pressurizer Level Control Channel Selector switch is in the "460+461" position
- An electrical failure causes the loss of a 120 VAC vital instrument bus
- With no operator actions, the following affects are observed
  - All letdown orifice valves close.
  - Letdown isolation LCV-460 closes.
  - All pressurizer heaters are tripped off.
  - Charging flow slowly reduces to minimum.

Which ONE (1) of the following electrical failures has occurred?

A. APN-5901 has been deenergized.

B.✓ APN-5902 has been deenergized.

C. APN-5903 has been deenergized.

D. APN-5904 has been deenergized.

QUESTION USAGE:

2011 RO NRC
(with Level transmitter rather than vital bus failures) RO98001 Audit Examination.

QUESTION HISTORY:

Modified from PZR LEVEL CNTRL SYS 24 to use loss of vital AC buss as initiator rather than level transmitter failures to match K/A WDB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because letdown isolation would occur with the selector switch in the normal 459+460 position (459 is Channel 1)

Incorrect because loss of Channel 1 has no effect if in the 460+461 position

B. CORRECT; The indications are that the pressurizer level bistable control channel has failed low; only 460 or 461 feed the bistable channel and 460 is selected.

C. Plausible because letdown isolation would occur in the given position for a loss of APN 5903 (channel III)

Incorrect because 461 is the controlling channel so a loss of Channel III in this position would cause charging flow to *increase* due to an indicated low level to the control circuit

D. Plausible because APN-5904 is a vital instrument bus and does power MCB control and protection instruments.

Incorrect because loss of Channel IV has no effect on PZR level control

K/A: 000057 Loss of Vital AC Inst bus AA2.12 Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: PZR level controller, instrumentation, and heater indications

K/A Match: K/A is met because candidate must know the affects of loss of a vital AC instrument bus (APN 5902) on Pressurizer level control and heaters

Selection criteria; No existing questions were linked to this K/A. Six Pressurizer level control system questions dealt with a level transmitter failing low (only credible direction for Westinghouse channel losing power.) PZR LEVEL CNTRL SYS 24 had the distractors related to different channels; this was modified to deal with different instrument busses to match the K/A.

Tier: 1 **Group:** 1
Importance Rating: RO 3.5 SRO
Technical Reference: Westinghouse drawing 108D837 sheet 11

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-3-22

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

15. 064A3.03 003/NEW//HIGHER//RO/SUMMER/1/24/11/NO

Given the following plant conditions:

- A Large Break LOCA occurs
- A lockout of XTF-31 occurs upon reactor trip
- The BOP Operator is monitoring indications for the Emergency Diesel Generators on the Main Control Boards

Which choice below identifies the following with regard to the "**A**" Emergency Diesel Generator response

1) The **MAXIMUM** time by design in which the Emergency Diesel generator will come up to speed during an emergency start

2) The expected meter response that will be observed by the BOP operator after this time elapses for "**Frequency DG A**"

A. Must come up to 60 Hz in a maximum of 7 seconds
The frequency will then stabilize at 60 Hz

B.✔ Must come up to 60 Hz in a maximum of 10 seconds
The frequency will then stabilize at 60 Hz

C. Must come up to 60 Hz in a maximum of 7 seconds
Frequency will then fluctuate every five seconds for the next 35 seconds

D. Must come up to 60 Hz in a maximum of 10 seconds
Frequency will then fluctuate every five seconds for the next 35 seconds

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011. (MRB 5/4/2011)

Rev. 1 Submitted by MRB based on 2nd validation.
Added bullet that XTF-31 is lost.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because 7 seconds is the time limit for the EDG START FAILURE alarm (XCP-636 pt. 6-1), which will shut down the EDG.

   Incorrect since the start failure timer stops at 335/375rpm.

B. CORRECT per IB-5 pg. 24 "The diesel generators are automatically controlled to power the safeguards buses when they are needed by the Engineered Safety Features Actuation System (ESFAS). Each diesel generator is designed to start automatically and to supply power within10 seconds after detection of a loss of the preferred power source by loss of voltage relays."

C. Plausible because 7 seconds is the time limit for the EDG START FAILURE alarm (XCP-636 pt. 6-1), which will shut down the EDG and the second part is the behavior of an EDG as its bus is loaded following EDG breaker closure, such as the *"B"* EDG in the given conditions.

   Incorrect since 1DA ("A" train ESF bus) will remain on offsite power (ESF transformer 4 for the conditions given.

D. Plausible because the first part is right and the second part is the behavior of an EDG as its bus is loaded following EDG breaker closure, such as the *"B"* EDG in the given conditions.

   Incorrect since 1DA ("A" train ESF bus) will remain on offsite power (ESF transformer 4 for the conditions given.

K/A: 064 Emergency Diesel Generator A3.03 Ability to monitor automatic operation of the ED/G system, including: Indicating lights, meters, and recorders

K/A Match: the K/A is met because the candidate must monitor operation of the automatic voltage regulator using installed meters to maintain the EDG reactive load within operating limits.

Selection criteria; new question
Tier: 2 **Group:** 1
Importance Rating: RO 3.4
Technical Reference: GS-2

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-2-15

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

facility response;

comments;

16. 063A2.01 002/NEW/VCS CLOSED/KNOWLEDGE//RO/SUMMER/1/20/11/NO

Given the following plant conditions:

- All offsite power has been lost (230KV and 115KV)
- Operators are taking action in accordance with EOP-6.0, LOSS OF ALL ESF AC POWER

Which ONE (1) of the choices indicates the battery voltage that must be maintained as directed by EOP-6.0 and the meter location where this voltage will be read?

A.✓	108V	Main Control Boards
B.	126 V	Local indication
C.	108V	Local indication
D.	126 V	Main Control Boards

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

KA replaced by 063A3.01
New for 2011 MRB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

Use local amp indication to justify for second part

A. CORRECT per EOP-6.0 reference (foldout) page.

B. Plausible because battery *amperage* is read locally and 126V is the setpoint for DV SYS OVRVOLT/UNDRVOLT alarm XCP-636 point 4-6.

Incorrect since *voltage* is read on the main control board.

C. Plausible because the first part is right and battery *amperage* is read locally.

Incorrect since Incorrect since *voltage* is read on the main control board.

D. Plausible because the second part is right and 126V is the setpoint for DV SYS OVRVOLT/UNDRVOLT alarm XCP-636 point 4-6.

Incorrect since the EOP limit on battery discharge is 108VDC.

K/A: 063 DC Electrical Distribution A3.01 Ability to monitor automatic operation of the DC electrical system including: Meters, annunciators, dials, recorders, and indicating lights

K/A Match: the K/A is met because the candidate must know how the disconnect switches are used to control the consequences of DC control circuit hot shorts and grounds due to a fire.

Selection criteria; Two existing bank questions were tied to this K/A (DC ELECT DIST SYSTEM 33 &35) but both were based on ARP at to "write a Maintenance Work Request" which is a weak match to "correct" in the K/A; distractors were also inplausible. A search of the whole bank for "grounds" in Stem or choices found mostly AC or non-electrical results; the selected question was the only one with connection to DC grounds.

Tier: 2 **Group:** 1
Importance Rating: RO 2.5
Technical Reference: FEP-2.0

Proposed references to be provided to applicants during examination: None

Learning Objective: 2474

10 CFR Part 55 Content: 41(b)8

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

17. 062K2.01 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/19/11/NO

Given the following plant conditions:

- 14% power
- The Main Generator is being paralleled per GOP-4A POWER OPERATION (MODE 1 - ASCENDING)
- The main generator is paralleled out of phase.
- The Generator Breaker and MAIN XFMR FEED OCB 8902 **simultaneously** open.

Which ONE (1) of the following describes the status of the reactor and RCPs ONE(1) minute after this event?

A. Rx tripped on low flow. No RCPs are running.

B. Rx tripped on low flow. All RCPs are running.

C. Rx critical. No RCPs are running.

D✓ Rx critical. All RCPs are running.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as AC ELECT DIST SYSTEM 59)

Rev. 1 (wdb 3/28/11) Changed first part of C. and D. from "Rx tripped on turbine trip" to "Rx critical". turbine trip will not cause a reactor trip below P-9.

Rev. 2 Submitted by Matthew R. Bender based on RJ comments.
Changed stem to add ONE (1) minute to make time more definite.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible, power momentarily lost to RCPs, Rx trip signal will be generated on low flow also.

Incorrect, BOP buses will transfer, flywheels will maintain flow for 1/4 second.

B. Plausible, second half is correct, but power is momentarily lost to all three reactor coolant pumps.

Incorrect, flywheels will maintain flow for 1/4 second.

C. Plausible, first half is correct and below 10% power there is not a reactor trip on loss of all flow.

Incorrect, BOP buses will transfer to Emerg Aux xfmrs and a low flow signal will not be created.

D. CORRECT, If generator bkr and OCB-8902 open within 15 cycles (other than bus O/C), the service busses will auto transfer to their alternate supply.

K/A: 062 AC Electrical Distribution K2.01 Knowledge of bus power supplies to the following: Major system loads

K/A Match: the K/A is met because the candidate must determine how the bus power supply to the Reactor Coolant Pumps (a major load) is affected by the given electrical transient

Selection criteria; Two existing bank questions were tied to this K/A, but they were not "major loads" (fire protection pump and PZR heaters). Reactor Coolant Pumps were selected as the most safety-significant major load. Four questions under "AC ELECT DIST SYSTEM" also had "RCP" or "Reactor Coolant Pump" in their stems or choices; one was short essay and two others (#154 and #190) had implausible distractors. #59 and #126 were similar except for power level, this question used because low power made the distractors more plausible.

Tier: 2 **Group:** 1
Importance Rating: RO 3.3
Technical Reference:

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-1-16

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

18. 045G2.4.31 004/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/31/11/YES

Given the following plant conditions:

- 100% power
- The crew has placed the GEN VOLT REG XFER Switch, in MAN.
- An operator is making manual adjustments with the EXC FIELD VOLT ADJ (MAN) Control Switch.
- XCP-633, point 2-1, REGULATOR CORE 1 ALARM, is received due to a loss of power from 1A1X.

Which ONE (1) of the following describes how the operator action affects the Main Generator load AND how the Main Generator Voltage Regulator will respond to the loss of 1A1X?

A.✓ Main Generator reactive load will vary; AND

A bumpless transfer to Core 2 will occur.

B. Main Generator reactive load will vary; AND

The Main Generator Breaker and Generator Field Breaker will OPEN.

C. Main Generator real load will vary; AND

A bumpless transfer to Core 2 will occur.

D. Main Generator real load will vary; AND

The Main Generator Breaker and Generator Field Breaker will OPEN.

QUESTION USAGE:

RO 2011 NRC
2009 NRC

QUESTION HISTORY: (as MAIN GENERATOR 46)

DISTRACTOR ANALYSIS:

A. CORRECT per Step 5 of AOP-301.1, Response to Electrical Grid Issues, (Rev. 0), directs the operator to ensure that the Main Generator loading is within the limits of the capability curve, and if NOT, make adjustments to the main Generator Voltage to ensure that the Main Generator MVARs remain within limits. According to TB-3 (p49-50, Rev 6), after synchronizing the Main generator to the grid, with the Voltage Regulator in AUTO, the GEN FIELD VOLTS ADJ is used to change a reference voltage signal, allowing the automatic regulator to adjust Exciter output and control reactive load on the Main Generator. By taking the voltage regulator to manual it changes where the controller takes feedback from and not the function of the voltage adjust switch. According to TB-3 (p19-20), the Main Generator EX2000 Voltage Regulator employs three regulators, or cores; Core 1, Core 2 and Core 3. While all three Cores are identical, Cores 1 and 2 are generating control signals, but Core 3 generates a supervisory & protection signal. When operating, either Core 1 or Core 2 is controlling the excitation of the Main Generator. While one Core is providing the control signal to the Exciter, the backup Core is generating the same signal but providing it to a dummy load resistor. In essence, this creates a "hot" backup that can be signaled to take control of the process immediately by Core 3. According to TB-3 (p20), when Core 1 or Core 2 fails, Core 3 senses this and takes appropriate action. If the failed Core is the controlling Core, Core 3 generates a "bumpless transfer" to the standby Core. If the failed Core is the standby Core, Core 3 senses this and generates an alarm.

B. Plausible because the 1st part is correct. Also plausible because, according to TB-3 (p23), if a bumpless transfer failed to occur, Core 3 will function to trip both the Main Generator and the Generator Field Breaker. Incorrect because a protection action is NOT needed in the conditions established in the stem. The bumpless transfer action will occur before the protective action. The protective action will occur if both Core 1 and Core 2 have failed.

C. Plausible because the 2nd half is correct. Incorrect because, according to TB-3 (p49-50, Rev 6), after synchronizing the Main generator to the grid, with the Voltage Regulator in AUTO, the GEN FIELD VOLTS ADJ is used to change a reference voltage signal, allowing the automatic regulator to adjust Exciter output and control reactive load on the Main Generator. Taking the voltage regulator to manual does not effect this function it just changes where the controller takes feedback from.

D. Plausible because, according to TB-3 (p23), if a bumpless transfer failed to occur, Core 3 will function to trip both the Main Generator and the Generator Field Breaker. Incorrect because a protection action is NOT needed in the conditions established in the stem. The bumpless transfer action will occur before the protective action. The protective action will occur if both Core 1 and Core 2 have failed.

K/A: 045 Main Turbine Generator G2.4.31 Knowledge of annunciator alarms, indications, or response procedures.

K/A Match: K/A is met because the candidate must know how to apply the limits in the Annunciator Response/ SOP procedure for Main Turbine Generator vibration response.

Selection criteria; no existing bank questions were tied to this K/A. This was the MAIN TURBINE question most directly based on annunciator response.

Tier: 2 **Group:** 2
Importance Rating: RO 4.2
Technical Reference:

Proposed references to be provided to applicants during examination:

Learning Objective: TB-3-12

10 CFR Part 55 Content: 41(b)5

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

19. 026K2.01 001/NEW//HIGHER//R0//1/19/11/NO

Given the following plant conditions:

- A large break loss of coolant accident has occured.
- Annunciator XCP-639 point 6-4, BUS 1DX LCKOUT 86B, was received two minutes ago
- No operator action has been taken

Which ONE (1) of the following statements identifies the supply that is powering the "A" Reactor Building Spray Pump?

A. 480V Bus 1DA1 from offsite power

B. 480V Bus 1DA1 from the "A" Emergency Diesel Generator

C. 7.2KV Bus 1DA from offsite power

D.✓ 7.2KV Bus 1DA from the "A" Emergency Diesel Generator

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 1 Submitted by MRB based on 2nd validation.
Changed stem to add bullet that LOCA has occured. This allowed the removal of capable of powering the spray pump to just what is powering the spray pump.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the similarly sized RHR pump gets 480V power from this buss, which is normally supplied from offsite power. For the given conditions, the *"B"* RHR pump would still have power available from offsite (buss 1DB1 from XTF-31)

Incorrect because the RB Spray pump motors are 7.2KV and "A" train power from 115KV offsite would not be available with the given lockout.

B. Plausible because the similarly sized RHR pump gets 480V power from this buss, which would be powered from the EDG two minutes after "A" train offsite power via 1DX switchgear was lost.

Incorrect because the RB Spray pump motors are 7.2KV.

C. Plausible because the power supply is right and 1DA is normally supplied from offsite (for the given conditions, *"B"* train 7.2KV would still be on offsite power from 230KV-7.2KV transformer XTF-31).

Incorrect because "A" train power from 115KV offsite would not be available with the given lockout.

D. CORRECT power supply which would be powered from the EDG two minutes after "A" train offsite power via 1DX switchgear was lost.

K/A: 026 Containment spray K2.01 Knowledge of bus power supplies to the following: Containment spray pumps

K/A Match: the K/A is met because the student must know which buss the pump is powered from and determine where the bus would powered from under the given conditions.

Selection criteria; Only two existing bank questions were tied to this K/A. one was short essay "what is the power supply?" (in my humble opinion, the only reasonable way to test this K/A wdb). The multiple choice question CONT SPRAY SYSTEM 49 had two "B" train distractors, which are not credible. New question written to precisely match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.2
Technical Reference: SOP-116

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-8-15

10 CFR Part 55 Content: 41(b)8

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

20. 001K2.01 002/MOD/VCS CLOSED/HIGHER//RO/SUMMER/1/24/11/NO

Given the following plant conditions:

- 100% power

Which ONE (1) of the following statements identifies the power supplies for the Rod Drive MG sets and the status of the reactor if a lockout occurs on XTF-31?

A.✓ 1B1, 1C1

100% power and stable

B. 1DA2, 1DB2

100% power and stable

C. 1B1, 1C1

Reactor tripped

D. 1DA2, 1DB2

Reactor tripped

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as ROD CONTROL 96)

Rev.1 (wdb 1/26/11) Replaced "1DA/1DB" with 1B1/1C1 to balance choices safety/nonsafety and to remove 7.2KV source (not plausible for 480VAC load).
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per IC-5. The normal power supply to 1B and 1C is from XTF-2 so the reactor remains at power if XTF-31 is locked out.

B. Plausible the fact that they are 480 V switchgear and the rods do play a safety significant function so powering them from ESF power is plausible. The second part is plausible if it was thought that only 1 of the two power sources were necessary to stay at power.

Incorrect because the power supplies are incorrect and if these were the power supplies the lockout would cause a trip.

C. Plausible because the buses are correct and XTF-31 is the alternate source fro 1C1 and would cause a trip if it was powering the bus.

Incorrect, normally at 100% power electricity if fed from XFT-2 and the lockout would not cause a trip.

D. Plausible because the voltage is correct and most important loads do receive safeguards power. The second part is plausible because XTF-31 is the normal source for 1DB2 and so a lockout would cause a trip.

Incorrect, the MG sets are powered from BOP power.

Alternate distractors C. 1A3/1C3, D. 1A3X, 1C3X wdb

K/A: 001 Control Rod Drive K2.01 Knowledge of bus power supplies to the following: One-line diagram of power supply to M/G sets

K/A Match: the K/A is met because the candidate must know the bus power supplies to the M/G sets.

Selection criteria; The only existing bank questions tied to this K/A was short essay or completion ("what is the power supply?". The selected question met the K/A but was not tied to it; it was the only bank question with "MG" in the stem or choices that related to power supplies.

Tier: 2 **Group:** 2
Importance Rating: RO 3.5
Technical Reference: SOP-403

Proposed references to be provided to applicants during examination: None

Learning Objective: IC-5-14

10 CFR Part 55 Content: 41(b)6

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

21. 000055EA2.06 006/NEW//KNOWLEDGE//RO/SUMMER//NO

Given the following plant conditions:

- MODE 6
- 1DB is deenergized for maintenance in the switchyard
- The Bus 1DA normal incoming breaker tripped open.
- The "A" Emergency Diesel trips on overspeed and cannot be restarted.

Which ONE (1) of the following relay(s), if actuated, would prevent closing the **normal** incoming breaker to 1DA?

1. BUS 1DX LCKOUT 86B
2. XFMR XTF31 LCKOUT 86T31
3. BUS 1EA O/C 51BX-1EA

A.✓ I ONLY

B. 2 ONLY

C. 1 AND 3

D. 2 AND 3

QUESTION USAGE:

2011 NRC RO Exam

QUESTION HISTORY:

Rev. 0 Submitted by MRB 7/17/2011
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. Per GS-2, SAFEGUARDS POWER, the normal incoming breaker for 1DA comes through 1DX. XTF31 goes to 1DB and so is not in the line for the normal incoming breaker to 1DA. Bus 1EA does have a lockout but it opens the breaker tieing it to 1DA and so does not prevent the normal incoming breaker to 1DA from closing.

B. Plausible because this is true for 1DB or for the emergency offsite breaker to 1DA.

   Incorrect because this will not prevent closing the normal incoming breaker to 1DA.

C. Plausible because 1 is necessary, and 1EA is a stub bus of 1DA.

   Incorrect because the 51BX lockout of 1EA will not prevent energizing 1DA.

D. Plausible because the first lockout would be true for the emergency offsite incoming breaker to 1DA and 1EA is a stub bus of 1DA.

   Incorrect because the question asks about the normal incoming breaker to 1DA and the 51BX lockout of 1EA will not preven closing the normal incoming breaker for 1DA.

K/A: 000055 Station Blackout EA2.06 Ability to determine or interpret the following as they apply to a station Blackout: Faults and lockouts that must be cleared prior to re- energizing buses.

K/A Match: K/A is met because the candidate must determine the lockouts that must be reset/deenergized in order to reenergize the ESF bus.

Selection criteria; no existing bank questions were linked to this K/A. Of the bank questions related to EOP-6.0 (Station Blackout) or AOP-304.1 (which ECA-0.0 uses to restore a dead ESF bus) this question had the most references to "lockouts and faults"

Tier: 1 **Group:** 1

Importance Rating: RO 3.7 SRO

Technical Reference: E-206-005, ARP-001-XCP-639 4-2, 6-4

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-2-13

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

22. 000056AK3.02 002/NEW//KNOWLEDGE//RO/SUMMER/12/2/10/NO

Given the following plant conditions:

- 100% power
- A sustained loss of offsite and onsite power occurs (BOP and ESF).

Which ONE (1) of the choices below completes the following statement?

EOP-6.0, LOSS OF ALL ESF AC POWER, directs that the service water pumps be _________ to ________.

A. placed in PULL TO LK NON-A

not overload the ESF bus when power is restored

B. placed in PULL TO LK NON-A

permit the operator to verify valve alignment prior to starting

C✓ left in NORMAL AFTER START

immediately provide DG cooling when power is restored

D. left in NORMAL AFTER START

immediately provide a heat sink for CCW when power is restored

QUESTION USAGE:

RO 2011 NRC exam

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because a large number of ESF loads are placed in PTL for this reason in EOP-6.0 (ECA-0.0).

Incorrect because the service water pumps are left in normal after start.

B. Plausible because this is another reason given by the ECA-0.0 background document to take a large number of ESF equipment to PTL.

Incorrect because the service water pumps are left in normal after start.

C. CORRECT. Caution to step 8 of EOP-6.0 states, A Service Water Pump should be kept available to automatically load on its ESF bus to provide DG cooling.

D. Plausible because the first part is correct and service water does provide a heat sink for CCW and CCW is important to seal cooling which is a major concern in EOP-6.0

Incorrect because CCW is placed to PTL and so does not need an immediate heat sink on engergizing of the bus.

<u>K/A:</u> 000056 Loss of Offsite Power AK3.02 Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Actions contained in EOP for loss of offsite power

<u>K/A Match:</u> the K/A is met because the candidate must know the actions in the procedure for EOP-6.0/W ECA-0.0 which applies if offsite *and* onsite power are lost to the ESF busses and the reason for that action.

<u>Selection criteria;</u> No existing bank questions were tied to this K/A. New question written to match K/A.

Tier: 1 **Group:** 1
Importance Rating: RO 4.4 SRO
Technical Reference: EOP-6.0 (ECA-0.0)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-6.0-05

10 CFR Part 55 Content: 41(b)10

<u>NRC Form ES-401-9 Comments (2011 NRC Exam):</u>

Facility Response:

comments;

23. 071A1.06 002/MOD//KNOWLEDGE//RO/SUMMER/5/5/11/NO

Given the following plant conditions:

- A Waste Gas Decay Tank release is in progress.
- The following is the current meteorology data.
  - 61m-10m ΔT is -1.40 °F
  - 40m-10m ΔT is -0.7 °F
  - Wind direction is from the East-Southeast at 3 mph.

Which ONE (1) of the choices below describes if the release can be continued and, if it must be stopped, the reason for doing so?

REFERENCE PROVIDED

A. The release may continue.

B. The release may not continue because it could be drawn into the Control Building.

C.✓ The release may not continue because it could be drawn into the Auxiliary Building.

D. The release may not continue because wind speed is not high enough for the stability class.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as WASTE GAS DISPOSAL S 31)

Rev 0 Submitted by Matthew R. Bender as a significantly modified question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because wind speed is enough for the current stability class.

Incorrect because the direction of the wind will allow the discharge to be drawn into the AB ventilation system.

B. Plausible because the release must be stopped because it could enter a ventilation system and the control room at normal operation does have air intake to maintain a positive pressure.

Incorrect because the direction of the wind is away from the control building.

C. CORRECT per HPP-709 (in NOTES). This statement is also part of SOP-119, Attachment VA, Gaseous Waste Release Worksheet-Control Room. Not a direct lookup because this precaution is not part of Table A which is what is provided.

D. Plausible because the wind speed is not enough for the stability class based on 40m-10m differential temperature.

Incorrect because Note 1 states that the stability class should be based on 61m-10m if available and the direction of the wind should call for the securing of the release anyway.

K/A: 071 Waste Gas Disposal A1.06 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Waste Gas Disposal System controls including: Ventilation system

K/A Match: the K/A is met because the candidate must know the effect of releasing waste gas with the wind blowing from the release point towards the Aux Building Ventilation intake.

Selection criteria; No existing bank questions were tied to this K/A. of the WASTE GAS DISPOSAL S(ystem) questions, this one was most directly tied to ventilation systems, significantly modified because West-Northwest was not plausible.

Tier: 2 **Group:** 2
Importance Rating: RO 2.5
Technical Reference: HPP-0709 SAMPLING AND RELEASE OF RADIOACTIVE GASEOUS EFFLUENTS, SOP-119

Proposed references to be provided to applicants during examination: SOP-119, Attachment VA page 5 of 5 Table A.

Learning Objective: HPP-709-01

10 CFR Part 55 Content: 41(b)13

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

24. 039A1.05 001/NEW//KNOWLEDGE//RO/SUMMER/1/19/11/NO

Given the following plant conditions:

- The plant was initially at 100% power
- A reactor trip occured

Which ONE (1) of the following statements identifies a Main Steam valve operation required to prevent excessive Reactor Coolant System cooldown?

A.✓ MSR EXTR STEAM BLOCK VLV XVG2811-MS <u>automatically</u> closes.

B. MS TO MSR'S GATE BYP VLV XVG2807-MS must be <u>manually</u> closed.

C. IPV-2231, MS/PEGGING STM TO DEAERATOR <u>automatically</u> closes.

D. PVT-2870 and PVT-2875, TO MSR A & B DRAINS must be <u>manually</u> closed.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011 (wdb, 1/19/11).
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per TB-2. Turbine will trip due to reactor trip, causing pressure to drop to <10%.

B. Plausible because this bypass valve would pass Main Steam to the MSR control valves if open, causing a drop in Tavg.

Incorrect because this valve closes automatically on turbine startup when MVG-2811 is fully open.

C. Plausible because this valve is closed in EOP-1.0 (Westinghouse E-0) ,REACTOR TRIP/SAFETY INJECTION ACTUATION if Tavg is below no-load and dropping

Incorrect because IPV-2231 *opens* automatically as deaerator pressure drops due to the loss of extraction steam after the turbine trip. It must be *manually* closed to limit cooldown per the EOP.

D. Plausible because these valves are checked in the EOP when Isolating excessive steam loads

Incorrect because the drain valves are just checked in AUTO (they are permitted to cycle open to keep steam lines free of condensate)

K/A: 039 Main and Reheat Steam A1.05 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: RCS T_{ave}.

K/A Match: K/A is met because candidate must know how to monitor MRSS controls in order to prevent exceeding limits on change of T_{avg} (below no-load after a reactor trip, which would be an uncontrolled addition of positive reactivity).

Selection criteria; No existing bank questions were tied to this K/A. Of the 66 questions with "MSR" in the stem or choices none addressed RCS temperature control. New question written to match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.2
Technical Reference: Handout TB-2, Main Steam

Proposed references to be provided to applicants during examination: None

Learning Objective: TB-2-16

10 CFR Part 55 Content: 41(b)4

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

25. 061K6.02 001/BANK/VCS CLOSED/KNOWLEDGE//RO/SUMMER/1/19/11/NO

Given the following plant conditions:

- A Main Steamline Break has occurred on the "B" SG.
- A reactor trip and Safety Injection have occured.
- The Motor Driven and Turbine Driven Emergency Feedwater pumps have started
  - Flow to the "B" SG is rapidly increasing.
- FCV-3541 MD EFP TO SG B and FCV-3546 TD EFP TO SG B are fully open.

Which ONE (1) of the below statements completes the following statement?

The MD EFW pump will be protected from runout damage by a control signal from _______ closing______.

A. FE 3571 on the combined EFW line both FCVs 3541 and 3546 at 515 gpm

B. FE 3571 on the combined EFW line both FCVs 3541 and 3546 at 730 gpm

C.✓ FE 3541 on the MD EFW line FCV 3541 at 515 gpm

D. FE 3541 on the MD EFW line FCV 3541 at 730 gpm

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as EFW SYSTEM 40)

Rev. 1 (wdb 1/19/11) added valve nomenclature and names, split into columns to improve readability.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because there is a high flow isolation from this flow element. Plausible that it would close both valve since flow from both valves goes through it.

Incorrect because it only closes the TD EFW valve and the setpoint is wrong.

B. Plausible because there is a high flow isolation from this flow element and the setpoint is correct. Plausible that it would close both valve since flow from both valves goes through it.

Incorrect because it only closes the TD EFW valve.

C. CORRECT per Annunciator Response Procedure.

D. Plausible because there is a high flow isolation from this flow element, there is an isolation (of the other valve) at 730 gpm and the right valve is listed.

Incorrect because setpoint is wrong for the MD EFW line

K/A: 061 Auxiliary/Emergency Feedwater K6.02 Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps

K/A Match: the K/A is met because the candidate must determine the effect of a malfunction (pump runout) on AFW components (valves).

Selection criteria; only one existing bank question was tied to this K/A: EFW 145 but the distractors were not very plausible. Several EFW System bank questions discussed the effect of pump runout (the malfunction) on other AFW components (valves). The selected question had the most plausible distractors (others listed non-existent valves or interlocks).

Tier: 2 **Group:** 1
Importance Rating: RO 2.6
Technical Reference: ARPs XCP-622 and -623, points 2-1

Proposed references to be provided to applicants during examination: None

Learning Objective: IB-3-20

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

26. 078K1.01 001/BANK/VCS CLOSED/KNOWLEDGE//RO/SUMMER/1/24/11/YES

Given the following plant conditions:

- 100% power
- "B" RB Instrument Air compressor is tagged out.
- "A" RB Instrument Air compressor just tripped on high discharge pressure.

Assuming no operator action, which ONE (1) of the following describes the response of the RB Instrument Air System?

A. RB air header pressure decreases until the plant must be manually tripped at 50 psig.

B. RB air header pressure decreases until the "A" RB Instrument Air compressor restarts at 93 psig.

C✓ RB air header pressure decreases until IPV-2659, INSTR TO RB AIR HDR VLV opens at 90 psig.

D. RB air header pressure decreases until the XAC-12, SUPP INST AIR COMPRESSOR, starts at 90 psig.

QUESTION USAGE:

RO 2011 NRC
2007 NRC

QUESTION HISTORY: (As RB INSTR AIR SYSTEM 12)

Rev. 1. Submitted by Matthew R. Bender
Ops Review: 3/25/2010 FL
Approved: 5/5/2010 WRQ
Added distractor analysis. Changed name of 2659 to true name. Changed distractor from "RB air header pressure decreases until the plant automatically trips." to "RB air header pressure decreases until the compressor restarts at 93 psig." to increase credibility, trip is manual not automatic

Rev.2 (wdb 1/24/11) Revised pressure in D. to 90 psig due to air compressor replacement in 2010. Added manual trip pressure to A so that each choice contained a pressure.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because without instrument air the reactor must be manually tripped.

Incorrect because the IA system will back up the RBIA system.

B. Plausible because in AUTO mode the air compressor will start and stop on pressure and the LAG RB IA compressor will start at 93 psig.

Incorrect because the compressor must be reset locally after a trip before it can run again.

C. CORRECT "This valve can be controlled from the MCB board with a CLOSE, AUTO, OPEN switch and opens in AUTO when IPS-8388 on the Reactor Building instrument air discharge header detects pressure less than 90 psig." AB-14 page 9

D. Plausible because the standby station instrument air compressor does start at 90#.

Incorrect because the start of the standby air compressor would not occur here and would not fix the issue if it did.

K/A: 078 Instrument Air K~~1.01~~ 1.03 Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Containment ~~Sensor~~ air.

K/A Match: the revised K/A is met because the candidate must determine the effect of a loss of the Reactor Building (containment) air compressors on the Instrument Air system through the cross-connect valve that physically connects them at low pressure.

Selection criteria; No existing question was tied to this K/A because VCS does not have a seperate "sensor" air system. The nearest "physical connections" are to Service Air (K1.02) and Containment (Reactor Building) Instrument Air (K1.03). Service Air connection is limited to a single valve that closes at one pressure, which makes finding 3 plausible distractors hard. Proposed replacement K/A is therefore K1.03. Three existing questions were tied to this K/A. Two were very low level of difficulty ("what is the setpoint", #8 and "what is the function", #15). RBIA #22 is useable but deals only with compressor starts. The selected question is the best fit for "physical connection"

Tier: 2 **Group:** 1
Importance Rating: RO 2.8
Technical Reference: Drawing 1MS-20-218, SOP-121 Encl. A

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-14-13

10 CFR Part 55 Content: 41(b)4

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

27. 000026AK3.02 001/NEW//KNOWLEDGE//RO/SUMMER/9/24/10/NO

Which ONE (1) of the following statements identifies why CCW to the RB is isolated and which signal causes the isolation?

A. Minimize release paths from the Reactor Building — Phase A

B.✓ Minimize release paths from the Reactor Building — Phase B

C. Maximize flow to the RHR heat exchangers during the Injection Phase of a LOCA — Phase A

D. Maximize flow to the RHR heat exchangers during the Injection Phase of a LOCA — Phase B

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011 NRC. WDB 9/24/10
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is correct and most RB penetrations are isolated by Phase A.

Incorrect because the isolation occurs on Phase B not Phase A

B. CORRECT per IC-9 "The purpose of Phase B is to bring about the second phase of isolation of containment due to containment integrity being challenged because of the increased pressure." and "Phase B causes CCW to the Reactor Coolant Pumps to be isolated"

C. Plausible because flow to the RHR Hx on the previously active CCW would be higher on recirculation with the RB isolated and phase A is used to align a large number of valves.

Incorrect because Nonessential loads are not in parallel with the RHR Hx during injection phase. Also per AB-10 "The RHR heat exchangers are not used to cool the water during the injection phase of emergency core cooling (i.e., the CCW to the heat exchanger is secured). The residual heat exchangers are needed, however, during the recirculation phases (cold and hot leg) of ECCS operation to cool the relatively hot water from the recirculation sumps prior to reinjecting this water into the RCS."

D. Plausible because flow to the RHR Hx on the previously active CCW would be higher on recirculation with the RB isolated and the isolation signal is correct.

Incorrect because Nonessential loads are not in parallel with the RHR Hx during injection phase.

K/A: 000026 Loss of Component Cooling Water AK3.02 Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS

K/A Match: the K/A is met must know why CCW is isolated by the ESFAS from the RB, which occurs automatically on a phase B signal in the ESFAS.

Selection criteria; No existing bank question matched this K/A. New question written to precisely match K/A.

Tier: 1 **Group:** 1
Importance Rating: RO 3.6
Technical Reference: IB-2

Proposed references to be provided to applicants during examination: None

Learning Objective: IB-2-13

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

28. 073K3.01 001/NEW//KNOWLEDGE//RO/SUMMER/5/5/11/NO

Given the following plant conditions:

- Mode 5
- An RB 36" purge is in progress

Which ONE (1) of the choices below completes the following statement?

The purge exhaust will be isolated if power is lost to ______ by the closing of _________ on the 36" purge exhaust from the reactor building.

A.✓ RM-A4
XVB-2A, CNTMT EXH ISOL ONLY

B. RM-A4
BOTH XVB-2A(B), CNTMT EXH ISOL

C. RM-A14
XVB-2A, CNTMT EXH ISOL ONLY

D. RM-A14
BOTH XVB-2A(B), CNTMT EXH ISOL

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 submitted by Matthew R. Bender as a new question.
Ops Review:
Approved:

Rev. 1 Submitted by MRB based on WRB comment.
Added "on the 36" purge exhaust from the reactor building" because without it the ONLY makes no correct answer.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. ARP-019 XCP-644 pt 4-4, RB PUR GAS RM-A4 TRBL, "AUTOMATIC ACTIONS: 1 On a loss of power to the monitor, the following valves trip closed: a PVB-1A, CNTMT SPLY ISOL. b. PVB-2A, CNTMT EXH ISOL. c. PVG-6056, ALT PUR SPLY ISOL VLV. d. PVG-6066, CNTMT PUR EXH ISOL VLV."

B. Plausible because the monitor is correct and typical isolations close two valves to each penetration.

Incorrect because RM-A4 only closes one supply and one exhaust. The other two are closed by RM-A2.

C. Plausible because the valve is correct and RM-A14 will monitor this path.

Incorrect because RM-A14 does not have any automatic functions.

D. Plausible because RM-A14 will monitor this path and typical isolations close two valves to each penetration.

Incorrect because RM-A14 does not have any automatic functions and only one valve is closed on each penetration by RM-A4.

K/A: 073 Process Radiation Monitoring K3.01 Knowledge of the effect that a loss or malfunction of the PRM system will have on the following: Radioactive effluent releases

K/A Match: the K/A is met becasue the candidate must know the procedure requirements related to a malfunction of Process monitor RM-A4 during a release from containment.

Selection criteria; new question.

Tier: 2 **Group:** 1
Importance Rating: RO 3.6
Technical Reference: RP-019 XCP-644 pt 4-4, RB PUR GAS RM-A4 TRBL

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-17-17

10 CFR Part 55 Content: 41(b)13

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

29. 2.3.11 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/2/8/11/NO

Given the following plant conditions:

- The contents of Waste Gas decay tank A were transferred to the Shutdown tank G on 10/5 at 0300.
- A Waste Gas release from Shutdown tank G was planned for 10/6 at 1500.
- The tank was sampled on 10/5 at 2330.
- The Release Permit was approved on 10/6 at 1730.
- Nothing else has been added to the tank that will be released.
- Weather conditions have delayed the release.

Which ONE (1) of the following statements identifies the **LATEST** that the release may be initiated without obtaining another sample?

A.✓ 2330 on 10/6

B. 0300 on 10/7

C. 1500 on 10/7

D. 1730 on 10/7

QUESTION USAGE:

RO 2011 NRC
2006 VCS Retake License Exam

QUESTION HISTORY: (as ADMIN PROCEDURE 377)

Rev. 1 (wdb 2/7/11) question was originally used for SRO-only, but objectives from HPP-709 lesson are also marked for RO. Changed correct answer to A., HPP-709 24 hour window is from sample time, not approval time. Added bullet to stem on last transfer to tank to make B. 0300 plausible, no previous source for 0300 as a relevant time.

Rev. 2 Submitted by MRB based on 2nd validation.
Changed time of release permit approval to 1730 from 1130.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per HPP-709 4.16, 2330 on 10/5 plus 24 hours is 2330 on 10/6.

B. Plausible because Waste Gas decay tanks A through F are rotated every 2 days (SOP-119 Encl A in NOTES). 10/5 at 0300 plus 2 days is 0300 on 10/7.

   Incorrect because this is a release, not a normal rotation.

C. Plausible because this is the right interval (24 hours later, 10/6 at 1500 plus 24 hours is 1500 on 10/7)

   Incorrect because time runs from *sample* not *intended time.*

D. Plausible because this is the right time (24 hours later, 10/6 at 1130 plus 24 hours is 1130 on 10/7).

   Incorrect because time runs from *sample* not *approval.*

K/A: 2.3.11 Ability to control radiation releases.

K/A Match: the K/A is met because the candidate must know the limitations on radiation releases.

Selection criteria; 3 existing bank questions were tied to this K/A. EPPS/FEPS268 is an SRO question about IED duties. LIQUID RAD WASTE 42 is a system question about rad monitors. RADIATION MONITORING is a negative Generic Fundamentals "what is the function" with implausible distractors. Avoided Liquid Radwaste due to 059 K/As for RO and SRO in sample plan. Six ADMIN PROCEDURE questions had "release" in the stem or choices. The first 3 (377, 387, and 388 where very similar and looked at the 24 hour limit on the release permit. #394 dealt with the time to recheck meteorological conditions, but some distractors were not plausible. #395 was not plausible because it had some group other than OPS do valve lineups. #397 regarded liquid rad waste in a rare condition (no Circ Water flow). Randomly took first of the first 3 almost-identical questions.

Tier: 3
Importance Rating: RO 3.8
Technical Reference: HPP-709

Proposed references to be provided to applicants during examination: None

Learning Objectives: HPP-709-01, -04

10 CFR Part 55 Content: 41(b)13

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response

Comments; Alternate distractor 1230 on 10/6 based on checking met conditions every hour during release. wdb

30. 103K4.04 002/NEW//KNOWLEDGE//RO//4/13/11/NO

Which ONE (1) of the following statements identifies conditions related to the Reactor Building Access airlock that would cause a SIMPLEX alarm in the Main Control Room?

A.✓ Either door open.

B. Either door has its vent valve open.

C. Both doors have their vent valves open.

D. Both doors open at the same time ONLY.

Alternate A. Either door interlock broken. wdb

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011. wdb 4/13/11.

Rev. 1 Submitted by Matthew R. Bender based on RJ comments.
Replaced choice "Pressure not equalized within 0.2 psig" with "Both doors have their vent valves open."
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per AB-13 page 14.

B. Plausible because alarm will occur if either door is open and with a vent valve open leakage is greater than design.

Incorrect because alarm is on door position, not condition of vent valve.

C. Plausible because of STP 215.001A looks to make sure that both vent valve cannot be open at the same time. Vent valves open prior to opening or unlatching of door.

Incorrect because this is a procedural test requirement and design feature, not a Simplex alarm.

D. Plausible because alarm will occur if either door is open.

Incorrect because of *both*.

K/A: 103 Containment R K4.04 Knowledge of containment system design feature(s) and/or interlock(s) which provide for the following: Personnel access hatch and emergency access hatch.

K/A Match: the K/A is met because the candidate must know what design features and interlocks are installed on the Personnel access hatch and emergency access hatch.

Selection criteria; No existing bank questions were tied to this K/A. Six existing questions had "hatch" in the stem or choices, but these were mostly SRO Tech Spec OPERABILITY calls. New question written to precisely match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 2.5
Technical Reference: AB-13

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-13-13 DESCRIBE the component operation associated with each switch position for the following switches and control: 1. Inside and Outside Containment Escape Hatch Operations Handle

10 CFR Part 55 Content: 41(b)9

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

31. 022A4.02 004/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/19/11/NO

Given the following plant conditions:

- 100% power
- RBCU TRAIN A EMERG switch is selected to XFN-64A
- A Safety Injection occurs
- The BOP is performing Attachment 3 of EOP-1.0, SI EQUIPMENT VERIFICATION

Which ONE (1) of the following statements describes the **MINIMUM** flow that the attachment will verify in each train of RBCUs and if RBCU-65A will have service water flow through its cooling coils?

A. 2000 gpm

RBCU -65A will have service water flow.

B.✓ 2000 gpm

RBCU -65A will **NOT** have service water flow.

C. 4000 gpm

RBCU -65A will have service water flow.

D. 4000 gpm

RBCU -65A will **NOT** have service water flow.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as CONTAINMENT CLG SYS 7)

Rev. 1 (wdb 1/19/11) removed "During a safety injection, the service water booster pumps start to supply the reactor building cooling units." from the stem, it was "teaching". Replaced "The service water booster pumps can take a suction on the reactor building sump if needed." as D., it was not plausible.

Rev. 2 Submitted by MRB based on 2nd Validation.
Changed recieve service water flow to have service water flow since inlets remain open.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the flow is correct and the second part is plausible because the inlet valve to RBCU-65A will be open and the outlet valve is typically open.

Incorrect because the outlet valve will be closed and so the RBCU will have no flow.

B. CORRECT. EOP-1.0 (E-0) checks that flow is >2000 gpm in Attachment 3 step 7c. Per IB-1 Service Water System page 26 states, "The normally open outlet valves from the non-selected RBCU close on an SI signal to maximize SW flow through the coils of the running RBCU.

C. Plausible because this is the design flow rate for each of the service water booster pumps and the inlet valve to 65A will be open and the outlet valve is typically open.

Incorrect because EOP-1.0 (E-0) checks for a minimum of 2000 gpm and the outlet valve for 65A will close on the safety injection signal.

D. Plausible because this is the design flow of the service water booster pumps and the second part is correct.

Incorrect because EOP-1.0 (E-0) checks for a minimum of 2000 gpm.

K/A: 022 Containment Cooling A4.02 Ability to manually operate and/or monitor in the control room: CCS pumps

K/A Match: the K/A is met because the candidate must be able to monitor that the service water booster pumps flow.

Selection criteria; five bank questions were tied to this K/A. One was SRO - level. One covered makeup from Filtered water (not really a SWS tie). Two others were CCS design criteria. Only the selected question exactly matched the K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.2
Technical Reference: EOP-1.0 (E-0) and IB-1

Proposed references to be provided to applicants during examination: None

Learning Objective: IB-1-07

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

32. 008A1.01 003/NEW//KNOWLEDGE//RO/SUMMER/5/3/2011/NO

Given the following plant conditions:

- SOP-118, COMPONENT COOLING WATER, section III.B, ACTIVE LOOP SWITCHOVER is being performed to make 'A' train the active loop.

Which ONE (1) of the following completes the following statement?

MVB-9503A, CC TO RHR HX A is taken to CLOSED and when flow on FI-7034, HX A FLOW GPM, is between ______ flow the non-essentials are swapped. MVB-9503B, CC TO RHR HX A, is taken to OPEN _____.

A.✓ 5000 gpm and 4000 gpm

WHILE non-essential valves are stroking

B. 5000 gpm and 4000 gpm

AFTER non-essentials valves have stroked

C. 2880 gpm and 1920 gpm

WHILE non-essential valves are stroking

D. 2880 gpm and 1920 gpm

AFTER non-essentials valves have stroked

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. The range is correct in accordance with SOP-118 and it is necessary to start the RHR valve stroking in the open direction while the B loop is being isolated from non-essentials to provide minimum flow to the B CCW pump.

B. Plausible because the range is correct and typically valves are allowed to stroke prior to going to the next step in a procedure.

Incorrect because the B CCW pump is still running. If the non-essentials were isolated from B without starting flow to the RHR HX low flow conditions could damage the B CCW pump.

C. From because this range deals with minimum flow through the CCW system, and the second part is correct. Enclosure B of SOP-118, "Discussion: Isolation of Component Cooling System loads is necessary when maintenance is performed on components. The best efficiency point for a Component Cooling Pump in slow speed is conservatively chosen at 9600 gpm. A minimum flow requirement for long term operation of the pumps is 30% (2880 gpm). For short term, less than 24 hours, 20% (1920 gpm) flow is acceptable, and 10% (960 gpm) flow is acceptable for several hours."

Incorrect because the range is wrong.

D. Plausible because this range deals with low flow of the CCW system and typically valves are allowed to stroke prior to going to the next step in a procedure.

Incorrect because the range is wrong and the valves are stroked at the same time.

K/A: 008 Component Cooling Water A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW flow rate

K/A Match: the K/A is met because the candidate must be able to monitor CCW flow changes in order to swap operating trains.

Selection criteria; New

Tier: 2 **Group:** 1
Importance Rating: RO 2.8
Technical Reference: SOP-118, COMPONENT COOLING WATER

Proposed references to be provided to applicants during examination: None

Learning Objective: IB-2-24

10 CFR Part 55 Content: 41(b)8

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

33. 000028AK2.03 002/BANK/VCS CLOSED/HIGHER//RO/SUMMER/4/13/11/NO

Given the following plant conditions:

- 100% power
- Charging flow transmitter FT-122 fails LOW.
- XCP-614 Point 5-1 "CHG LINE FLO HI/LO" alarm is received

Which ONE (1) of the following describes the response of Charging Flow Control Valve (FCV-122)?

A. Will fully close.

B.✓ Will fully open.

C. Throttles open to a maximum flow position of 150 gpm.

D. Throttles closed to a minimum flow position of 15 gpm.

QUESTION USAGE:

2011 RO NRC exam

QUESTION HISTORY: (as CVCS 48)

Rev. 1 (wdb 4/13/11) Placed stem in standard format. Moved ""CHG LINE FLO HI/LO" alarm will be received." to the stem since it was in each choice.

Rev. 2 Submitted by Matthew R. Bender based on Duke comments. (4/26/11)
Changed C and D from FCV-122 will not be affected. FCV-122 will throttle to the minimum flow position, since nothing will happen is not as plasusible.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because assuming that the charging flow control valve will fail in the same direction as the flow transmitter is a common mistake.

Incorrect because the flow controller will see indicated flow lower than the demand and open FCV-122.

B. CORRECT because The Master Pressurizer Level Controller will develop an output signal based on a comparison of actual Pzr level to Programmed level (from median select Tavg). The output of the Master controller will then be sent Charging Flow controller 122, which will determine the required charging flow, compare that to actual flow, and develop an output based on the error. In the given conditions of the question, the "sensed" charging flow will go to zero, so FCV will go fully open.

C. Plausible because FCV will stroke in the open direction and 150 gpm is the maximum flow that is indicated on the MCB and a minimum flow position does exist.

Incorrect because FCV-122 will see indicated flow less than demand per the discussion for B above and go fully open.

D. Plausible because FCV does have minimum closed position when operated in AUTOMATIC, and assuming that the charging flow control valve will fail in the same direction as the flow transmitter is a common mistake.

Incorrect because the flow controller will see indicated flow lower than the demand and open FCV-122.

K/A: 000028 Pressurizer Level Malfunction AK2.03 Knowledge of the interrelations between the Pressurizer Level Control Malfunctions and the following: Controllers and positioners

K/A Match: the K/A is met because the candidate must know how a failure of the flow transmitter in the PZR Level Control system will affect the charging flow controller.

Selection criteria; No existing bank questions were tied to this K/A. 24 existing bank questions had AOP-40.16 as a reference: most were to AA2.12 to analyze level channel failures or AA1.08 to select an operable channel. The selected question was the best fit to "controller response".

Tier: 1 **Group:** 2
Importance Rating: RO 2.6
Technical Reference: AOP-401.6, PRESSURIZER LEVEL CONTROL AND PROTECTION CHANNEL FAILURE

Proposed references to be provided to applicants during examination: None

Learning objective; AB-3-30

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments; Taskmaster Question # 2163.

34. 004A2.09 002/NEW//KNOWLEDGE//RO/SUMMER//NO

Given the following plant conditions:

- The reactor has been at 100% power for 30 days.
- Annunciator XCP-642, point 4-3, RC LTDN LO RNG RM-L1 HI RAD, is in alarm
- Chemistry reports an increase in Iodine activity

Which ONE (1) of the following actions is required with regard to letdown flow?

Increase flow though the ______________________ to ________.

A. Cation bed demineralizer 120 gpm

B. Cation bed demineralizer 165 gpm

C✓ Mixed bed demineralizers 120 gpm

D. Mixed bed demineralizers 165 gpm

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.

Rev. 1 Submitted by MRB based on 2nd validation.
Removed in accodance with the ARP from the stem because the ARP does not direct use of the mixed bed demins.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because cation beds are used and this is the right flow rate.

Incorrect because cation beds are used to control lithium concentration of the primary.

B. Plausible because cation beds are used and this is the maximum flow rate achievable with the plants orfices (2-60gpm and 1-45 gpm).

Incorrect because letdown flow is not normally above 120 gpm and cation beds are used to control lithium concentration of the primary.

C. CORRECT. XCP-642, point 4-3 directs that letdown flow be increased to 120 gpm and typical letdown flow is through the mixed beds.

D. Plausible because this is the correct demineralizer and the flow rate is acheivable with the plant's orfices (2 @ 60gpm each and 1 @ 45gpm).

Incorrect because letdown flow is not normally higher than120 gpm.

K/A: 004 Chemical and Volume Control A2.09 Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High primary and/or secondary activity

K/A Match: K/A is met because candidate must know how to use the CVCS system to control high primary activity

Selection criteria; No bank questions were tied to this K/A. Of the questions mentioning "fuel failure" or "RM-L1" most were SAP-154, Failed Fuel Action Plan knowledge (Shift Supervisor/STA area) or very low level "what does RM-L1 monitor?".

Tier: 2 **Group:** 1
Importance Rating: RO 3.0
Technical Reference: Annunciator XCP-642, point 4-3, RC LTDN LO RNG RM-L1 HI RAD

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-3-05

10 CFR Part 55 Content: 41(b)5

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

Comments; Taskmaster Question # 1861

35. 007G2.4.18 002/NEW//KNOWLEDGE//RO/SUMMER/1/18/11/NO

Given the following plant conditions:

- A Loss of Coolant Accident and Safety Injection have occured
- The crew is implementing EOP-1.0 REACTOR TRIP/SAFETY INJECTION ACTUATION
- Step 24 directs the crew to "check PRT conditions are normal"

Which ONE (1) of the following is the basis for this check?

A.✓ Diagnose a leaking PZR PORV

B. Diagnose a failed RCP No. 2 seal

C. To check if the PRT should be vented

D. To determine if the PRT rupture disks have failed

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011 RJ
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per EOP-1.0 (WOG E-0) basis.

B. Plausible because the number 1 seal from the reactor coolant pumps during a safety injection goes to the PRT.

Incorrect because the number 2 seal goes to the RCDT.

C. Plausible because the PRT has rupture discs and so venting the PRT will cause them not to rupture.

Incorrect because the purpose is to detect where reactor coolant is being lost and not to vent the PRT.

D. Plausible because a rupture of the PRT discs would cause reactor coolant to be lost to containment.

Incorrect because if the rupture discs did fail the PRT conditions would be close to normal.

K/A: 007 Pressurizer Relief/Quench Tank G2.4.18 Knowledge of the specific bases for EOPs.

K/A Match: The K/A is met because the candidate must know the basis for an EOP step that looks at PRT conditions.

Selection criteria; No existing bank questions were tied to this K/A. Questions referencing EOP-18.2 were either at the SRO level or did not address the PRT. New question written to match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.3
Technical Reference:

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-1.0-05

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

#35 Ø07 G2.4.18

STEP: Check PRT Conditions - NORMAL

PURPOSE: To check if there is any leakage into the PRT

BASIS:

Leakage into the PRT may come from various sources (e.g., seal return, valve stem leak-off). Evaluating the cause of any abnormal PRT conditions may assist the operator in the diagnosis of the plant fault (e.g., a leaking PORV).

ACTIONS:

- o Determine if PRT conditions are normal
- o Evaluate cause of abnormal conditions

INSTRUMENTATION:

- o PRT level indication
- o PRT temperature indication
- o PRT pressure indication

CONTROL/EQUIPMENT:

N/A

KNOWLEDGE:

- o Flow paths that enter the PRT
- o "Normal" means the valve of a process parameter experienced during routine plant operations.

PLANT-SPECIFIC INFORMATION:

N/A

36. 006A3.01 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/17/11/NO

Given the following plant conditions:

- A Loss of Coolant Accident has occurred.
- RCS pressure is 350 psig and dropping slowly.
- All equipment actuations have occurred as designed.
- NO action has been taken by the crew.

Which ONE (1) of the following statements describes the status of the Safety Injection System?

	SI Accumulator Level	RHR Flow
A.	Stable and on-scale	Zero
B.✓	Dropping or off-scale low	Zero
C.	Dropping or off-scale low	Rising
D.	Stable and on-scale	Rising

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

SAFETY INJECTION SYS 43

Rev. 1 (wdb 1/17/11) reduced pressure from 500 to 350 psig to make "rising RHR" choices more plausible. Changed "lowering" to "dropping" in B. and C., more common useage.

Rev. 2 (wdb 4/4/11) removed column for Charging/SI flow, not needed to answer question and not clear what the effects of SI line cavitating venturis would be at low pressure (SI flow more of less choked off, would not rise significantly. Expanded first column to cover loss of level (Level indicator only covers about one foot in the middle of the tank.)
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the second part is right and accumulators do not start injecting until pressure drops to between 600 and 656 psig.

Incorrect because accumulators should begin injection between 600 and 656 psig and continue to inject as pressure lowers.

B. CORRECT; Accumulators are not isolated until pressure drops to 140 psig and the centrifugal. RHR pumps do not deliver flow above 250 psig.

C. Plausible because the first part is right and RHR flow would increase with dropping pressure *if* not above shutoff head; 350 psig is in RHR pressure band for decay heat removal during normal cooldown.

Incorrect because RCS pressure is above the RHR pump shutoff head.

D. Plausible because RHR flow would increase with dropping pressure *if* not above shutoff head (350 psig is in RHR pressure band for decay heat removal during normal cooldown) and accumulators do not start injecting until pressure drops to between 600 and 656 psig..

Incorrect because RCS pressure is above the RHR pump shutoff head and pressure is low enough that the accumulators are injecting water.

K/A: 006 Emergency Core Cooling A3.01 Ability to monitor automatic operation of the ECCS, including: Accumulators

K/A Match: the K/A is met because the operator must monitor operation of the ECCS pumps as the pressure in the RCS drops below the accumulator gas pressure and RHR pump shutoff head respectively.

Selection criteria; Three bank questions were tied to this K/A. All three had the same matrix, the only difference being the given RCS pressure. This one was used for the best match to the K/A since the accumulators were either not injecting yet or had already been isolated in the other two (SIS-45 and -46).

Tier: 2 **Group:** 1
Importance Rating: RO 4.0
Technical Reference: EOP-2.0 (Westinghouse E-1) Background

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-10-09

10 CFR Part 55 Content: 41(b)14

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

37. 000036AA2.03 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- A refueling outage is in progress.

Which ONE (1) of the following incidents has the potential for the greatest release of radioactivity within **ONE(1)** hour after occurrence?

A.✓ A spent fuel assembly is dropped in the spent fuel pool during core off-load for refueling.

B. A new fuel assembly is dropped on the new fuel storage racks during transit to the spent fuel pool.

C. After core re-load, with the reactor vessel head off and the cavity full, electrical problems cause a loss of RHR.

D. With the core off-loaded, a misalignment causes Spent Fuel Pool to start to transfer to the Refueling Water Storage Tank.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:(as FUEL HANDLING EQUIP 23)

Rev.1 (wdb 12/20/10) changed "in the refueling canal" in present B. to "in the spent fuel pool", not plausible for an unirradiated assembly to cause a release without striking irradiated fuel or causing a reactivity concern. Rearranged choices from short to long. Added duration of loss to C. and clarified "cavity full", loss of RHR at reduced inventory is a core damaging sequence.

Rev. 1 Submitted by Matthew R. Bender based on RJ review.
Changed time frame from two hours to one hour.
Changed D from "With the core off-loaded, a leak causes Spent Fuel Pool level to lower and stabilize when the Spent Fuel Cooling Pump suction intake uncovers."

Rev. 1 Submitted by MRB based on on 2nd validation.
Changed D from "transfered" to "start to transfer" (so it would not be inferred that the water was already transfered.)
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. End of cycle gives the maximum isotopic load per fuel assembly.

B. Plausible because the dropped fuel assembly would have no water shielding to reduce gamma dose or partition iodine.

Incorrect because a new fuel assembly has a very low isotopic inventory compared to a spent fuel assembly.

C. Plausible because extended core uncovery could release significant radioactivity.

Incorrect because the volume of water in the cavity would delay boiling for several hours and core uncovery for many days.

D. Plausible because uncovery of irradiated fuel will immediately increase dose rates in the area and extended uncovery could cause clad failures. Also, immediately after core offload gives the highest heat input into the Spent Fuel Pool.

Incorrect because the design of the piping to and from the pool preserves sufficient level in the pool even in the events of pipe breaks or lineup errors.

K/A: 000036 Fuel Handling Accident AA2.03 Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: Magnitude of potential radioactive release

K/A Match: The K/A is met because the candidate must compare the magnitude of potential radioactive releases of several fuel handling incidents.

Selection criteria; only two bank questions were tied to this K/A. The other bank question, AOPS-117, dealt only with AOP immediate actions and did not address the magnitude of the potential release.

Tier: 1 **Group:** 2
Importance Rating: RO 3.1
Technical Reference:

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-4-15, GS-5-18

10 CFR Part 55 Content: 41(b)13

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

38. 012K5.01 002/NEW//HIGHER//RO/SUMMER/1/18/11/NO

Given the following plant conditions:

- 100% Power
- PCV-444D, PZR SPRAY, sticks open.

Which ONE (1) of the following Reactor Protection System Trips protects against DNB (Departure from Nucleate Boiling) and how the above failure will affect the associated setpoint?

A. Overpower Delta T (OPΔT), setpoint will increase

B. Overpower Delta T (OPΔT), setpoint will decrease

C. Overtemperature Delta T (OTΔT), setpoint will increase

D.✓ Overtemperature Delta T (OTΔT), setpoint will decrease

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the setpoint for OPΔT does change with temperature and it may be thought that when the setpoint increase towards actual power then the trip occurs.

Incorrect because OPΔT does not change with pressure and OPΔT is a setpoint that decreases towards current power and not the reverse.

B. Plausible because OPΔT is affected by temperature and the second part is the right direction if it was affected.

Incorrect because OPΔT does not change with pressure.

C. Plausible because OTΔT does change with pressure and it could be a misconception that the setpoint rises to current power to cause the trip.

Incorrect because with pressure lowering the setpoint will lower.

D. CORRECT. Technical Specifications Table 2.2-1 contains the formula for OTΔT. As pressure lowers its setpoint lowers.

K/A: 012 Reactor Protection K5.01 Knowledge of the operational implications of the following concepts as the apply to the RPS: DNB

K/A Match: the K/a is met because the candidate must know which trips protect against Departure from Nucleate Boiling.

Selection criteria; Three bank questions (RCS temp 22, RPS 156, and RPS159) were tied to this K/A. The layout on RCS temp 22 was confusing (poor psychometrics). The distractors on RPS 159 were less plausible.

Tier: 2 **Group:** 1
Importance Rating: RO 3.3
Technical Reference: TS Limiting Safety Settings Basis
Proposed references to be provided to applicants during examination: None

Learning Objective: IC-9-16

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments; RW guessed wrong (B). I don't have TS bases memorized. (Safety limit bases are RO knowledge wdb.)

39. 007A4.10 001/MOD/VCS CLOSED/HIGHER//RO/SUMMER/1/17/11/NO

Given the following plant conditions:

- The plant is shutdown in Mode 3.
- One Pressurizer Code Safety is leaking to the PRT.
- Pressurizer pressure is 1385 psig.
- Pressurizer relief tank (PRT) pressure is 5 psig.
- PRT temperature is 90°F.

Assume:

- Ambient heat losses are negligible.
- Steam quality in the pressurizer bubble is 100%.

Which ONE (1) of the following is closest to the expected temperature, as read on TI-465 on the MCB, in the tail pipe downstream of the leaking Pressurizer Code Safety?

A. 228°F

B.✓ 260°F

C. 285°F

D. 587°F

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as Thermal Sciences 20)

Rev. 1 (wdb 1/17/11) deleted "steady at" from PRT temperature and pressure in the stem, inconsistent with continuing leakage and not needed for evaluation. Changed A. from 230°F to 227°F to match saturation temperature for plausibility. Changed B from 250°F (arbitrary number) to 285°F to give a number that could be found on the Mollier diagram via a plausible mistake. Changed D. from 340°F to 556°F for plausibility.

Changed pressure of the primary to create a different question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible this is the saturation pressure of 5 psig.

Incorrect because given steam conditions yield a superheated discharge.

B. CORRECT. Proper use of the Mollier diagram.

C. This is using the proper technique with the Mollier but stopping when reached the saturation line on the other side.

Incorrect the steam will become superheated.

D. Plausible because this is saturation temperature for the given steam pressure.

Incorrect because the adiabatic expansion drops steam temperature from the initial value.

K/A: 007 Pressurizer Relief/Quench Tank A4.10 Ability to manually operate and/or monitor in the control room: Recognition of leaking PORV/code safety

K/A Match: the K/A is met because the operator must be able to monitor the temperature in the tail pipe to the PRT to recognize a leaking PORV.

Selection criteria; Three bank questions were tied to this K/A. RCS 4 and 35 were really more focused on Reactor Protection outputs than monitoring PRT conditions. RCS110 did deal with flowpaths to the PRT but that question is very similar to one on the 2011 RO audit exam.

Tier:	2
Group:	1
Importance Rating:	RO 3.6
Technical Reference:	Steam Tables

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: 398

10 CFR Part 55 Content: 41(b)14

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

40. 005K6.03 002/MOD/VCS CLOSED/HIGHER//RO/SUMMER/1/17/11/NO

Given the following plant conditions:

- The plant is in Mode 4.
- RHR Train "A" is in service.
- The Instrument Air supply line to HCV-603A RHR HEAT EXCHANGER A OUTLET VALVE falls off (is completely detached).

Which ONE (1) of the choices below identifies the following:

1) The failure position of HCV-603A

2) The temperature trend of RHR injection flow (temp recorder RHR LOOP A TEMP TR-604B (T-606A)) ten minutes after the failure?

A. 1) OPEN
2) Temperature rises

B.✓ 1) OPEN
2) Temperature drops

C. 1) CLOSED
2) Temperature rises

D. 1) CLOSED
2) Temperature drops

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a significant modification of RHR SYSTEM 122
Rev. 1 Submitted by MRB based on 2nd validation.
Changed "The temperature trend downstream of the 'A' RHR heat exchanger" to "The temperature trend of RHR injection flow" since that is what is seen in the control room.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is correct and the temperature of the water coming out of the heat exchange will rise with more RHR flow and the same CCW flow rate.

   Incorrect because with more water going through the heat exchanger and less being bypassed overall temperatures with decrease.

B. CORRECT. Increased flow through the heat exchanger causes HX bypass valve FCV-605A to close, so more cold water from the HX mixes with less hot water from the bypass and the combined temperature drops.

C. Plausible because the valve is an air operated valve and could fail closed. If it did fail close the recorder temperature would increase since bypass flow would still exist and so the recorder would go up to RCS temperature.

   Incorrect because the valve fails open.

D. Plausible because the valve is an air operated valve and so it could fail closed. If this temperature recorder were before the mixing of the bypass and heat exchanger flow then stagnant heat exchanger water would be cooled by remaining CCW flow and temperature would drop.

   Incorrect because the temperture recorder is positioned to measure the combined flow both from the heat exchanger and bypass flow.

K/A: 005 Residual Heat Removal K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger

K/A Match: The K/A is met because the candidate must determine the effect of a particular failure on the RHR heat exchanger.

Selection criteria; Modified from a bank question.

Tier: 2 **Group:** 1
Importance Rating: RO 2.5
Technical Reference: AB-7

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-7-26

10 CFR Part 55 Content: 41(b)14

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

41. 041K1.02 002/MOD/VCS CLOSED/HIGHER//R0/VCS/1/28/11/NO

Given the following plant conditions:

- 13% power
- Steam dumps are in the STEAM PRESSURE mode
- The Main Generator is ready to be paralleled to the grid
- The synchroscope is running fast in the FAST direction

Which ONE (1) of the following actions would cause a "swell" in S/G water level?

A. Placing the steam dumps in T_{AVG} MODE

B. Inserting control rods 5 steps in MANUAL

C.✓ Lowering the setpoint on the STM DUMP CNTRL potentiometer (clock)

D. Adjusting turbine controls to reduce the speed of rotation of the synchroscope

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Significant modification of STEAM GENERATOR SYST 8

Rev. 1 (wdb 1/28/11) placed in preferred format. Replaced A. "Shutting the MSIV bypass valves after opening the MSIVs at hot shutdown." to prevent double jeopardy with 035K6.01 and inserted new correct answer. replaced B. "Increase the feedwater addition rate at 5% power." because it was almost correct (not "swell" but would raise SG level). Replaced C."A rapid decrease in main generator load." because that was not credible for swell. replaced D. "A steam dump valve opens at 5% power." to raise the cognitive level.

Rev. 2 Submitted by Matthew R. Bender
Changed direction of synchroscope travel to make B wrong (was a second correct answer)
Changed D to Placing the steam dumps in Tavg from "Closing the generator breaker" because it was partially correct. It would cause a minor amount of swell until steam dumps closed to maintain steam pressure.

Rev. 3 Submitted by MRB based on 2nd validation.
Changed B from withdrawing control rods to inserting control rods and changed C to from raising setpoint to lowering setpoint to make correct to more closely match the KA. Correct answer changed to C.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because in steam pressure mode the setpoint is typically set to 1092 and Tavg is manually raised above Tref to force steam to go the steam dumps.Therefore the Tavg MODE would have a demand signal which *tries* to open the dumps.

Incorrect because in Tavg MODE a arming signal is required since the load rejection arming signal is not it taking the control switch to Tavg would cause all of the dumps to close and lead to shrink and not swell.

B. Plausible because rods will affect power and thus has the potential to cause swell.

Incorrect because the decrease in Tavg will lower steam pressure, causing the steam dumps to close, lowering steam demand and causing a shrink in SG level.

C. CORRECT because lowering the set pressure down will open the steam dumps momentarily until pressure comes down to the new set pressure. Opening the steam dumps causes swell due to increased steam flow and decreased steam header pressure.

D. Plausible because *increasing* turbine steam demand will cause swell.

Incorrect because the given operation *reduces* turbine valve opening to slow the turbine, *reducing* steam demand.

K/A: 041 Steam Dump/Turbine Bypass Control K1.02 Knowledge of the Physical connections and/or cause-effect relationships between the SDS and the following systems: S/G level

K/A Match: the K/A is met because the candidate must determine the change in Steam Dump position and the consequent shrink or swell of SG level.

Selection criteria; No existing bank questions were tied to this K/A. No "Steam Dump" questions addressed SG level. The selected question was the only "Steam Generator" question that addressed steam dumps.

Tier: 2 **Group:** 2
Importance Rating: RO 2.7
Technical Reference: TS-12 (in NOTES)

Proposed references to be provided to applicants during examination: None

Learning Objective: TB-1-09

10 CFR Part 55 Content: 41(b)4

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

42. 035K6.01 001/MOD/VCS CLOSED/HIGHER//RO/SUMMER/1/17/11/NO

Given the following plant conditions:

- 25% power
- All plant controls are in automatic.
- The 'A' MSIV inadvertently closes.
- NO operator actions are performed.

Which ONE (1) of the following choices identifies how secondary parameters would change **IMMEDIATELY** after the MSIV closure?

A. Steam Generator 'A' pressure will decrease.

B.✓ Steam Generator 'B' pressure will decrease.

C. Steam Generator 'C' narrow range level will decrease.

D. Steam Generator 'A' narrow range level will increase.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Substantial modification of STEAM GENERATOR SYST 5

Rev. 1 (wdb 1/28/11) changed distracter D. from "Steam Generator 'C' pressure", not plausible for one unisolated SG ("C") pressure to respond differently from the other steaming SG ("B"). Changed stem to "decrease" and exchanged "pressure" for "level" between A and C to make A new right answer. This was to avoid double jeopardy with K/A 041K1.02 on this NRC test, which force SG level response to steam demand change (would have been double jeopardy on "shrink and swell".

Rev. 2 Submitted by Matthew R. Bender based on RJ comments.
Changed D. from "Main turbine load will increase" to "Steam Generator 'A' narrow range level will increase."
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because steam pressure will change in all three SGs

Incorrect because the non-steaming loop's average temperature will go to Thot and there will be no temperature drop from primary to secondary, causing *high* steam pressure in the isolated SG.

B. CORRECT, the increased steaming rate in the steaming SGs increases the primary to secondary delta T, dropping steam pressure due to the reduced heat transfer area.

C. Plausible because the unisolated SG's levels will respond strongly.

Incorrect because the increased steaming rate on the unisolated SGs will swell their levels *up*.

D. Plausible because with no load on the A steam generator and the continuation of feed flow the level will eventually increase.

Incorrect because initially on the loss of load the level in the A steam generator will decrease due to shrink.

K/A: 035 Steam Generator K6.01 Knowledge of the effect of a loss or malfunction of the following will have on the S/GS: MSIVs

K/A Match: the K/A is met because the candidate must analyze the effect of MSIV closure on the Steam Generators

Selection criteria; Two existing bank questions were tied to this K/A. MS1 was very simplistic ("describe MSIVs") and had implausible distractors. The selected question was also a better match to the "affect on the SGs" part of the K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.2
Technical Reference: TS-12 THEORY OF NORMAL TRANSIENTS AND SELECTED ABNORMAL TRANSIENTS

Proposed references to be provided to applicants during examination: None

Learning Objective: TB-1-09

10 CFR Part 55 Content: 41(b)4

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

43. 003K5.04 003/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- 25% power
- The 'A' RCP pump was removed from service.

Which one (1) of the following choices identifies the change in 'B' and 'C' steam generator steam flows and pressures 10 minutes after stopping 'A' RCP as compared to the values before the pump was stopped?

ASSUME NO OPERATOR ACTIONS IN PROGRESS

	B/C Steam Flows	B/C Steam Generator Pressures
A.	Higher	Same as before
B.✓	Higher	Lower
C.	Same as before	Same as before
D.	Same as before	Higher

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is correct and rods will move to keep Tavg the same and primary temperature is related to steam generator pressures.

Incorrect because although Tave will remain the same Tcold in the B and C loops will change and thus steam generator pressures will change.

B. CORRECT. When the 'A' RCP is stopped the two remaining steam generators will pick up the additional load since steam demand (throttle position) does not change. Thus steam flow from the B and C steam generators will increase. Rods will move to maintain Tave constant but with more power transfered through the B and C steam generators the delta T across them will increase. Since the steam generators are at approximately saturation temperature of Tcold and Tcold decreases the steam generator pressures decrease.

C. Plausible because it is a common mistake that a change in the A loop will not effect the B and C loop.

Incorrect because when the A RCP stops B and C loops pick up power since total steam demand remains relatively constant.

D. Plausible because if it is thought that the B and C loops do not pick up power but the loss of the heat removal from the A loop causes the primary to heat up.

Incorrect because B and C will pick up load and rods will move to maintain Tave.

K/A: 003 Reactor Coolant Pump K5.04 Knowledge of the operational implications of the following concepts as they apply to the RCPS: Effects of RCP shutdown on secondary parameters, such as steam pressure, steam flow, and feed flow.

K/A Match: K/A is met because the operator must determine the effect of loss of RCP flow on the secondary side steam flow.

Selection criteria; New.

Tier: 2 **Group:** 1
Importance Rating: RO 3.2
Technical Reference: SOP101

Proposed references to be provided to applicants during examination: None

Learning Objective: TS-12-20

10 CFR Part 55 Content: 41(b)5

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

44. 2.3.13 002/MOD/VCS CLOSED/KNOWLEDGE//RO/SUMMER/2/7/11/NO

Given the following plant conditions:

- Plant is in an outage in Mode 6
- A system restoration valve lineup is required in a room that is posted **"Locked High Radiation Area"**

Which ONE (1) of the choices below identifies the following:

1) The radiation level at which this posting is required

2) A requirement for the operator to conduct the lineup

A.✓ 1000 mrem/hr
Must be accompanied by an HP representative with a radiation monitor.

B. 1000 mrem/hr
Must be radiation monitor qualified and carry a radiation monitor into the area.

C. 500 rads/hr
Must be accompanied by an HP representative with a radiation monitor.

D. 500 rads/hr
Must be radiation monitor qualified and carry a radiation monitor into the area.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Significant modification of RADIATION 19 MRB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per HPP 152 and HPP160.

B. Plausible because the dose level is correct and the coverage is correct for a (non-locked) HIGH radiation area

Incorrect since HP coverage is required.

C. Plausible because the HP coverage is correct and the dose level is the definition of a very high radiation area

Incorrect since the stem specifies a locked HIGH radiation area

D. Plausible because the dose level is the definition of a very high radiation area and the coverage is correct for a (non-locked) HIGH radiation area

Incorrect since the dose level is the definition of a very high radiation area

K/A: 2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

K/A Match: the K/A is met because the candidate must know the requirements for access to locked high-radiation areas

Selection criteria; only one existing bank question (AOPS 625) was tied to this K/A but it was already selected for the 2011 audit. 37 questions were tied to various HPPs. The selected question was the best fit to this K/A.

Tier:	3	
Importance Rating:	RO	3.4
Technical References:	HPP-152 and HPP-160	

Proposed references to be provided to applicants during examination: None

10 CFR Part 55 Content: 41(b)12

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

45. 2.1.31 001/BANK/VCS CLOSED/KNOWLEDGE//RO/SUMMER/2/2/11/NO

Which ONE (1) of the below choices completes the following statement in accordance with OAP-100.5, GUIDELINES FOR CONFIGURATION CONTROL AND OPERATION OF PLANT EQUIPMENT?

During extended outages, the Danger Tag restoration position of a system flow control valve is normally ________________ and a ____________________________ is used to position components prior to system startup.

A.	closed	system lineup
B.✓	as tagged	system lineup
C.	closed	Component Realignment and Verification Log
D.	as tagged	Component Realignment and Verification Log.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

ADMIN PROCEDURE 183

Rev. 1 Submitted by Matthew R. Bender based on RJ comments.
Changed C and D first half from documented on to normally ____ like A, B.
Changed both C and D to being tracked on the same document to make a 2X2

Rev. 2 Submitted by MRB based on 2nd validation.
Removed quotations from first part of answer.
Changed "as-is" to "as tagged" to match what is actually written in as the position (do not write in as-is)
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because vents and drains are typically closed and the second part is correct.

Incorrect because most valves that are not vents or drains are left as is.

B. CORRECT per OAP-100.5 section 9.11.b.

C. Plausible because vents and drains are normally closed and a Component Realignment and Verification Log does exist to place components in the correct position.

Incorrect because components may be left "as is" and the Component Realignment and Verification Log is used for non-tagged components.

D. Plausible because a Component Realignment and Verification log is used in SAP-201 Encl A 2.1.12. and the valves are typically left as is.

Incorrect the Component Realignment and Verification Log is used for non-tagged components.

K/A: 2.1.31: Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.

K/A Match: the K/A is met because the candidate must know where to find the desired plant lineup for danger tagged component restoration.

Selection criteria; No existing bank questions were tied to this K/A. 18 "ADMIN PROCEDURE" questions also had "lineup" in the stem or choices. The selected question seemed most applicable to "control room switches"

Tier: 3
Importance Rating: RO 4.6
Technical Reference: SAP-201 EQUIPMENT TAGGING AND LOCKOUT-TAGOUT

Proposed references to be provided to applicants during examination: None

Learning Objective: SAP-201-05

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

Given the following plant conditions:

- The NROATC and the CRS are the only ones present in the Control Room

Which ONE (1) of the choices below correctly completes the following statement regarding a requirement of SAP-200, CONDUCT OF OPERATIONS?

The NROATC may enter the **Area of Secondary Attention** in:

A. MODE 6 ONLY to acknowledge alarms OR to record routine data.

B. MODE 6 ONLY to acknowledge alarms but may NOT do so to record routine data.

C. MODE 5 OR 6 to acknowledge alarms OR to record routine data.

D.✓ MODE 5 OR 6 to acknowledge alarms but may NOT do so to record routine data.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as ADMIN PROCEDURE 368)

Rev.1 (dow 1/22/07) Modified D by changing "Modes 1 and 2 only" to "any Mode."

Rev. 2 (wdb 2/2/11) reordered from short to long. Added MODEs to A. to specifically match SAP. Bolded both in A. since that is the only word that makes it wrong. Bolded one phrase in each choice for consistency (two positions, two MODE statements). Added "any MODE" to D., since that was the only choice left without a MODE statement.

Rev. 3 (wdb 3/28/11) changed stem from "RO" to "operating crew" to keep D. plausible.

Rev. 4 (wdb 4/7/11) changed "should" to "shall" in A. to make clearly wrong per validation feedback.

Rev. 5 Submitted by Matthew R. Bender based on RJ comments.
Changed question from a collection of true false statements.

Rev. 6 Submitted by MRB based on 2nd Validation.
Bolded and underlined secondary. Added routine to all choices to match wording of SAP better.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the area may be entered in MODE 6.

   Incorrect due to ONLY and because entry for routine data recording is not permitted.

B. Plausible because the area may be entered in MODE 6 and because entry for routine data recording is not permitted.

   Incorrect due to ONLY.

C. Plausible because the MODES are right.

   Incorrect since entry for routine data recording is not permitted.

D. CORRECT per SAP-200 section 6.6.8 page 11

K/A: 2.1.2:Knowledge of operator responsibilities during all modes of plant operation.

K/A Match: the K/a is met because the candidate must know RO responsibilities in various MODES per the Station Administrative Procedure.

Selection criteria; 15 existing bank questions were tied to this K/A. AP 60 had inplausible distractors. AP 131, 146, 159, 160, 162, 163, 204,205, 277,dealt with STA functions (not "operator"?, SRO). AP169, 296, 297, were AO level (local prestart checks, rounds). GS11 was a snubber question. SIS41 was more of an EOP/systems question. selected question picked by process of elimination

Tier: 3
Importance Rating: RO 4.1
Technical Reference: SAP-200 CONDUCT OF OPERATIONS

Proposed references to be provided to applicants during examination: None

Learning Objective: SAP-200-04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

#46 2.1.2

6.6 Reactor Operator (RO):

6.6.1 The Shift Supervisor shall ensure that the Reactor Operator watch station is manned at all times with fuel in the reactor vessel or during the operation of the facility. The RO watch station must have an active Reactor or Senior Reactor Operator License. CHG B

6.6.2 Only licensed operators are permitted to manipulate the controls that directly affect reactivity and power level of the reactor. An operator in training for a license may manipulate the controls, provided he is directly supervised and observed by a licensed operator and has been trained on the evolution to be performed.

6.6.3 Operation of mechanisms and apparatus other than controls, which may indirectly affect the power level or reactivity of the reactor, shall only be accomplished with the knowledge and consent of the RO.

6.6.4 The RO shall be alert and attentive to plant conditions at all times. If they cannot fulfill their responsibilities for any reason, they should notify the Shift Supervisor or Control Room Supervisor and request relief.

6.6.5 During plant operations in Mode 1, 2, 3, or 4, the RO should not, under any circumstances, leave the surveillance area defined as Area of Continuous Attention for any non-emergency reason (e.g., to confer with others or for personal reasons), without obtaining a qualified relief. CHG B

6.6.6 During plant operations in Mode 1, 2, 3, or 4, either the RO or the BOP Operator should be in the Green Carpeted Area adjacent to the Main Control Board, so that they are immediately available to operate Main Control Board controls as required.

6.6.7 The RO is responsible for reactivity manipulations. During an absence of the RO the BOP operator will assume those duties.

6.6.8 During plant operations in Mode 5 or 6, the RO may momentarily enter the Area of Secondary Attention in order to verify receipt of an annunciator alarm or initiate corrective actions. He should not enter the Area of Secondary Attention for routine conditions such as data recording.

47. 2.1.29 003/BANK/VCS CLOSED/KNOWLEDGE//RO/SUMMER/5/5/11/NO

Which ONE (1) of the following statements identifies what is the MINIMUM projected dose for which the shift supervisor may waive the requirement of independant verification in accordance with SAP-153, COMPONENT/CONDITION VERIFICATION?

A. 5 mrem

B.✓ 10 mrem

C. 50 mrem

D. 100 mrem

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 1 Submitted by Matthew R. Bender of Admin Procedure 100. Changed distractors for plausibility.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this is the dose per hour for posting a Radiation Area per HPP-0160 5.1.1.

Incorrect since this is not the limit for waiving independant verification.

B. CORRECT per SAP-153 6.2.2 page 7.

C. Plausible because this is the HPP-0160 dose per hour for posting a HOT SPOT in 5.11.

Incorrect since this is not the limit for waiving independant verification.

D. Plausible because this is the HPP-0160 dose per hour (listed as 0.1 Rem) for posting a High Radiation Area in 5.2 pg. 7.

Incorrect since this is not the limit for waiving independant verification.

10 CFR Part 55 Content: 41(b)12

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

K/A: 2.1.29 Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.

K/A Match: the K/A is met because the candidate must know how to conduct valve lineups in High Radiation zones.

Selection criteria; Significant modification.

Tier:	3
Importance Rating:	RO 4.1
Technical Reference:	SAP-0153 COMPONENTCONDITION VERIFICATION

Proposed references to be provided to applicants during examination: None

Learning Objective: SAP-153-04

48. 2.4.39 003/NEW//KNOWLEDGE//RO/SUMMER/5/6/11/NO

Given the following plant conditions:

- A fire requires the evacuation of the control room.
- The CRS has directed the RO to perform the actions of FEP-4.0, CONTROL ROOM EVACUATION DUE TO FIRE, as well as modifications from Enclosure B of FEP-1.0, FIRE EMERGENCY PROCEDURE SELECTION.
- It is determined that a modification to FEP-4.0 is required

Which ONE (1) of the following correctly identifies an immediate action performed by the **BOP** and how immediate operator actions are implemented when a modification is required?

A. Trip the reactor;
Modifications may affect immediate actions and should be implemented promptly

B. Operate disconnect switches;
Immediate operator actions should always be performed first before modifications are implemented

C. Trip the reactor;
Immediate operator actions should always be performed first before modifications are implemented

D✓ Operate disconnect switches;
Modifications may affect immediate actions and should be implemented promptly

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question

Rev. 1 Submitted by MRB based on 2nd Validation
Removed exact modification number to not confuse students.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the reactor will be tripped.

Incorrect since the RO will trip the reactor, not the BOP.

B. Plausible because the first part is right and Immediate Operator Actions (IOA) are normally performed before pulling out other procedures.

Incorrect since FEP modifications may prevent IOAs.

C. Plausible because the reactor will be tripped and Immediate Operator Actions (IOA) are normally performed before pulling out other procedures.

Incorrect since FEP modifications may prevent IOAs and the RO will trip the reactor, not the BOP.

D. CORRECT per AOP-600.1.

K/A: 2.4.25 Knowledge of fire protection procedures.

K/A Match: the K/A is met because the candidate must know the RO responsibilities during hostile action or a large-area fire.

Selection criteria; No existing bank questions were tied to this K/A. New question written to match K/A.

Tier: 3
Importance Rating: RO 3.9
Technical Reference: OAP-103.4, EOP/AOP USER'S GUIDE, and EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN

Proposed references to be provided to applicants during examination: None

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

49. 2.4.34 003/MOD/VCS CLOSED/KNOWLEDGE//RO/SUMMER/2/8/11/NO

Given the following plant conditions:

- The reactor has been tripped
- The control room has been evacuated due to a fire in the Main Control Board.
- The Control Room Evacuation Panel (CREP) has been manned.

Which ONE (1) of the following statements identifies how the crew will control pressurizer pressure in accordance with FEP-4.0, CONTROL ROOM EVACUATION DUE TO FIRE?

A. Group 1 Pressurizer backup heaters are cycled locally at XSW 1DA.

B.✓ Group 2 Pressurizer backup heaters are cycled locally at XSW 1DB.

C. Control Group Pressurizer heaters are cycled locally at XSW 1DB.

D. Pressurizer PORV-444B and 445A are cycled locally at the CREP.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as EPPS/FEPS 66)

Rev. 0 Submitted by Matthew R. Bender as a significant modification of EPPS/FEPS 66.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because a single train is selected to operate the plant.

Incorrect because FEP-4.0 deenergizes A train to prevent undesired equipment operation due to hot shorts. (See Encl C)

B. CORRECT per FEP-4.0 step 3.8.a

C. Plausible because heaters will be controlled locally at the switchgear and a single train is used.

Incorrect because the control group cannot be operated from the CREP.

D. Plausible because this is the PORV control is available at the CREP.

Incorrect because the pressure control is via heaters to avoid loss of RCS inventory through the PORVs.

K/A: 2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.

K/A Match: The K/A is met because the candidate must know the actions performed by the Reactor Operator during a Fire Emergency procedure.

Selection criteria; only one existing bank question was tied to this K/A; EPPS/FEPS 68 which is a low level "where does the Balance of Plant Operator go?". Of the 19 Questions with FEP-4.0 CONTROL ROOM EVACUATION DUE TO FIRE as a reference, the selected question was the best fit to "actions of the RO".

Tier: 3
Importance Rating: RO 4.2
Technical Reference: FEP-4.0

Proposed references to be provided to applicants during examination: None

Learning Objective: 2457

10 CFR Part 55 Content: 41(b)5

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

50. 086K3.01 002/MOD//KNOWLEDGE//RO/SUMMER/2/1/11/NO

Given the following plant conditions:

- A fire has occurred in Cable Spreading Rooms zone CB-15.
- A failure of the preaction sprinkler system has resulted in extensive damage
- Several pieces of equipment operated inadvertently due to "hot shorts"
- The crew is implementing FEP-4.0 CONTROL ROOM EVACUATION DUE TO FIRE

Which ONE (1) of the below choices completes the following statement?

The __________ Emergency Feedwater pump will be feeding SGs, and 'A' train electrical equipment will be powered from ________ .

A.✓ Turbine Driven — the EDG

B. Turbine Driven — offsite power

C. "A" motor driven — the EDG

D. "A" motor driven — offsite power

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as EPPS/FEPS 212)

Rev. 1 (wdb 2/1/11) moved common wording from each choice to stem, clarified initial conditions to match K/A. Changed range in A. and C. from "30 and 50%" to a range used in EOP-1.0 REACTOR TRIP SAFETY INJECTION ACTUATION (in NOTES). Changed motor driven pump in D. from "B" to avoid a partially correct answer, FEP-4.0 does permit use of the "B" pump.

Rev. 2 Submitted by Matthew R. Bender based on RJ comments.
Replace WR vs NR SG levels with basic mitigation strategy of where power to the B train will come from.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per FEP-4.0 Encl F.

B. Plausible because the pump is right and FEP-3.0 TRAIN B PLANT SHUTDOWN TO HOT STANDBY DUE TO FIRE, uses offsite power to conduct the shutdown.

   Incorrect because FEP-4.0 uses the EDG even if offsite power is available.

C. Plausible because this is the power supply used in FEP-4.0 and the FEP-4.0 does allow the use of the "B" motor driven pump if the turbine driven pump is not capable of maintaining level.

   Incorrect because power is removed from the "A" train to prevent undesired equipment operation due to hot shorts.

D. Plausible because FEP-4.0 does allow the use of the "B" motor driven pump if the turbine driven pump is not capable of maintaining level and FEP-3.0 TRAIN B PLANT SHUTDOWN TO HOT STANDBY DUE TO FIRE, uses offsite power to conduct the shutdown.

   Incorrect because power is removed from the "A" train to prevent undesired equipment operation due to hot shorts and FEP-4.0.

K/A: 086 Fire Protection K3.01 Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following: Shutdown capability with redundant equipment

K/A Match: the K/A is met because the candidate must know the impact that a malfunction of the fire protection system in the cable spreading room will have on the redundant EFW equipment and the preferred redundant power supply to 1DB (EDG vs offsite).

Selection criteria; No existing questions were tied to this K/A. Of the "shutdown after a fire" questions, the selected question was the best fit to "capability with redundant equipment"

Tier: 2 **Group:** 2
Importance Rating: RO 2.7
Technical Reference: FEP-4.0 CONTROL ROOM EVACUATION DUE TO FIRE

Proposed references to be provided to applicants during examination: None

Learning Objective: FEP-4.0-10

10 CFR Part 55 Content: 41(b)4

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

51. 2.4.31 003/NEW//HIGHER//RO/SUMMER/5/6/11/NO

Given the following plant conditions:

- 100% power
- A safety injection occurred due to a loss of coolant accident.
- Operators are taking action in accordance with EOP-1.0, Reactor Trip/ Safety Injection Actuation
- XCP-612 pt 4-2, PHASE B ISOL, alarms
- Operators have determined that 8801A AND B, HI HEAD TO COLD LEG INJ, failed to OPEN.

Which ONE (1) of the following statements identifies whether the RCPs should be tripped and the status of RCP seal cooling?

A.✓ Trip all RCPs immediately.
Seal cooling still exists.

B. Trip all RCPs immediately.
All seal cooling has been lost.

C. Leave the RCP's running.
Seal cooling still exists.

D. Leave the RCP's running.
All seal cooling has been lost.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per EOP-2.0 reference (fold-out) page.

B. Plausible because Phase B removes CCW flow from the Thermal Barrrier Heat Exchanger and normal charging is isolated.

   Incorrect since seal injection flow through HCV-186 is not isolated.

C. Plausible because RCPs improve heat transfer from the fuel and EOP-14.0 (FR-C) does run RCPs without CCW or other support conditions.

   Incorrect since EOP-2.0 stops the pumps when cooling is lost to permit later use if essential.

D. Plausible because the second part is right and RCPs improve heat transfer from the fuel and EOP-14.0 (FR-C) does run RCPs without CCW or other support conditions.

   Incorrect since seal injection flow through HCV-186 is not isolated.

K/A: 2.4.31 Knowledge of annunciator alarms, indications, or response procedures.

K/A Match: the K/A is met because the candidate must know how the Emergency Procedures respond to a phase B annunciator.

Selection criteria; New question.

Tier:	3
Importance Rating:	RO 4.2
Technical Reference:	EOP-2.0 (E-1)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-2.0-04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

52. W/E02G2.2.44 002/NEW//HIGHER//RO/SUMMER/5/6/11/NO

Given the following plant conditions:

- The crew is responding to a Faulted S/G.
- The S/G has blown dry.
- The crew has transitioned to EOP-1.2, SI TERMINATION.
- "A" Charging Pump is running
- The crew has just secured "B" Charging Pump
- RCS pressure is increasing

Which ONE (1) of the following describes the actions that will be taken next and why a reduction in SI flow should be done expeditiously?

A. Normal charging should be established.
To preserve RWST inventory.

B.✓ Normal charging should be established.
To prevent the pressurizer from going solid.

C. Stop low head safety injection pumps.
To preserve RWST inventory.

D. Stop low head safety injection pumps.
To prevent the pressurizer from going solid.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this is the purpose of checking RCS pressure at this point and EOP-1.2 does place charging flow off from the VCT which does preserve RWST level. From Generic Issue: SI Termination/Reinitiation, "ECA-1.1 addresses the loss of emergency coolant recirculation capability, and one of the objectives of the guideline is to delay RWST depletion by reducing outflow from the tank. Since SI flow will cause a considerable depletion of the RWST, it is important that SI be terminated.

B. CORRECT. because this is the purpose of checking RCS pressure at this point. From Generic Issue: SI Termination/Reinitiation, "In HP plants, guidelines E-0, E-1, ECA-2.1, stable or increasing RCS pressure, in combination with the other termination criteria, is used to spot or realign the charging/SI pumps in order to prevent pressurization of the RCS to the pressurizer PORV or safety valve setpoints for loss of reactor or secondary coolant events." If inventory is lost from the PORV's or Safeties it will build pressure in the PRT and eventually enter containment.

C. Plausible because RHR pumps are secured in EOP-1.2 and will preserve RWST inventory.

Incorrect because this is done in EOP-2.0 (E-1). (The step for securing RHR pumps in EOP-1.2 (ES-1.1) does not check pressure, relying on the previous check done after stopping the charging/SI pump). and the reason to secure SI is to prevent the loss of inventory from the PORVs and safeties.

D. Plausible because the low head injection pumps are secured in EOP-1.2 (ES-1.1)

Incorrect because this is done in EOP-2.0 (E-1). (The step for securing RHR pumps in EOP-1.2 (ES-1.1) does not check pressure, relying on the previous check done after stopping the charging/SI pump).

Another potential concern is PTS in re pressurizing the RCS.

K/A: W/E02 SI Termination 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

K/A Match: K/A is met because question requires candidate to know how his action (reducing SI flow) should affect control room indications.

Selection criteria; No bank questions were tied to this generic K/A. The only other G2.2.44 SI Termination question (041G2.2.44) was already selected for the SRO Audit exam.

Tier: 1 **Group:** 2
Importance Rating: RO 4.2
Technical Reference: EOP-1.2 (Westinghouse ES-1.1)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-1.2-04.

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

53. 002K5.14 003/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- Steam Generator Tube Rupture occurred
- Reactor Trip and Safety Injection occurred
- Offsite power (115KV and 230KV) was lost after reactor trip.
- Both diesels have started and loaded.
- The operating crew is performing EOP-4.0, STEAM GENERATOR TUBE RUPTURE
- The RCS cooldown is complete

Which ONE (1) of the following describes the first method of depressurization that will be attempted and an effect that the loss of power will have on the RCS system response during the depressurization?

A. Auxiliary Spray
Steam Generator Tubes may void causing an interruption in natural circulation

B. Auxiliary Spray
Reactor Vessel Head Upper Plenum may void causing a rapid rise in Pressurizer level

C. Pressurizer PORV
Steam Generator Tubes may void causing an interruption in natural circulation

D.✓ Pressurizer PORV
Reactor Vessel Head Upper Plenum may void causing a rapid rise in Pressurizer level

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.

Rev. 1 Submitted by MRB based on 2nd validation.
Added that diesel started and loaded.
Removed word duplication in stem "method first method"
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because if Auxiliary Spray is available it would be preferable, and without reactor coolant pumps maintaining natural circulation is desired and with pressure dropping voiding could occur.

   Incorrect because the safety injection isolated letdown and so auxiliary spray is not available and voiding would occur in the reactor vessel and not in the steam generator tubes.

B. Plausible because if Auxiliary Spray is available it would be preferable and the second part is correct.

   Incorrect because the safety injection isolated letdown and so auxiliary spray is not available.

C. Plausible because the first part is correct and dropping pressure could cause voiding and without RCPs maintaining natural circulation is important.

   Incorrect because voiding would occur in the reactor vessel and not in the U-tubes.

D. CORRECT. Per EOP-4.0 (E-3) step 22 and 23 if the RCP's are not running Normal PZR Spray is not available and without letdown in service (isolated on the safety injection) then the depressurization is done with one PZR PORV. Without RCP's running voiding could occur during the depressurization. Voiding would most likely occur at the reactor vessel head since it has the least about of cooling flow and is the hottest part of the RCS.

K/A: 002 Reactor Coolant System (RCS) K5.14 Knowledge of the operational implications of the following concepts as they apply to the RCS: Consequences of forced circulation loss

K/A Match: the K/A is met because the candidate must know that a consequence of forced circulation loss is removal of core bypass flow, which permits formation of steam voids in the Reactor Vessel head.

Selection criteria; New question.

Tier: 2 **Group:** 2
Importance Rating: RO 3.8
Technical Reference: EOP-4.0 (Westinghouse E-3)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-4.0-04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

54. 000038EA2.04 002/NEW//HIGHER//RO/SUMMER/11/31/10/NO

Given the following plant conditions:

- Originally at 100% power
- Blowdown is aligned to the condensor
- Annunciator MN STM LINE RM-G19 HI RAD (XCP-646, 2-1) has actuated.
- An automatic reactor trip and Safety Injection occurred.
- The following response is seen on RM-G19A:

	Before trip	After 10 minutes
Reading :	39.7 mREM/hr	0.1 mREM/hr

Which ONE (1) of the following describes the reason for the RM-G19A response and another radiation monitor that will be used to diagnose a transition to EOP-4.0, STEAM GENERATOR TUBE RUPTURE?

A. Primary to secondary leak flow has decreased
RM-L3, Steam Generator Blowdown Liquid Monitor

B. N-16 gamma radiation detected has decreased
RM-L3, Steam Generator Blowdown Liquid Monitor

C. Primary to secondary leak flow has decreased
RM-A9, Cndsr Exhaust Gas Atmos Monitor

D.✓ N-16 gamma radiation detected has decreased
RM-A9, Cndsr Exhaust Gas Atmos Monitor

QUESTION USAGE:

2011 RO NRC exam

QUESTION HISTORY:

Rev. 0 Submitted 6/30/2011 MRB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because RM-G19's are used to detect primary to secondary leaks and RM-L3 could detect secondary leaks if blowdown was aligned to be discharged to the circulating water system.

   Incorrect because the drop off in the reading of RM-G19 is expected to drop after a trip due to the decay of N-16 after the trip and RM-L3 is out of service since blowdown is aligned to the condenser.

B. Plausible because the first part is correct and RM-L3 could detect secondary leaks if blowdown was aligned to be discharged to the circulating water system.

   Incorrect because RM-L3 is out of service since blowdown is aligned to the condenser.

C. Plausible because RM-G19's are used to detect primary to secondary leaks and the second half is correct.

   Incorrect because the drop off in the reading of RM-G19 is expected to drop after a trip due to the decay of N-16 after the trip.

D. CORRECT. Per GS-09, RADIATION MONITORING SYSTEM, page 45, "Expect the readings on RM-G19 to drop sharply immediately after a reactor trip, because the production of short-lived N-16 stops immediately after the trip." page 34, "Its (RM-A9) purpose is to detect primary to seconday system leakage through the steam generator tubes."

K/A: 000038 SGTR EA2.04 Ability to determine or interpret the following as they apply to a SGTR: Radiation levels (mREM/hr)

K/A Match: K/A is met because candidate must interpret radiation levels in mREM/hr as sensed by steamline area monitors (General Area monitors RM-G19A/B/C) and detmine another backup radiation monitor that can be used in the given plant configuration.

Selection criteria; No bank questions were tied to this K/A. New question written to precisely match K/A.

Tier: 1 Group: 1

Importance Rating:	RO	3.9
Technical Reference:	GS-9	
Learning objective;	GS-9-22	

Proposed references to be provided to applicants during examination: None

10 CFR Part 55 Content: 41(b)11

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

55. W/E04EK1.3 002/BANK/VCS CLOSED/KNOWLEDGE//RO/SUMMER/12/7/10/NO

Given the following plant conditions:

- A Loss of Coolant Accident outside containment has occurred.
- The crew is performing the actions in EOP-2.5, LOCA OUTSIDE CONTAINMENT.

Which ONE (1) of the following indications is used to determine if the leak has been isolated in accordance with EOP-2.5?

A.✓ RCS pressure

B. Pressurizer level

C. Safety injection flow

D. RVLIS indication

QUESTION USAGE:

RO 2011 NRC
2006 VCS Retake Audit Exam

QUESTION HISTORY; (as EOPS552)

Rev. 1 (wdb 12/7/10) removed " because when the break is isolated," from each choice, redundant to the stem.
Changed "it is the first parameter that will change" in C. to be a reason like the other 3 choices; also, specified "decrease" since if the site of the leakage is the ECCS piping, SI flow would change immediately when the leak was isolated.
Changed "head voiding will immediately be reduced" to make D. more wrong: if the head was voided, it would begin refilling immediately after the break is stopped. High pressure (at power) leak paths like letdown outside containment are not large enough to cause head voiding.

Rev. 2 Submitted by Matthew R. Bender based on RJ comment
Removed reasons since they were not necessary to answer question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per EOP-2.5 (ECA-1.2) Background.

B. Plausible because RCS inventory and PZR level will eventually be recovered.

Incorrect because high RCS pressure (small leak) will limit SI flow or significant voiding (unlikely large LOCA ORC) will delay fill of SG U-tubes and the PZR.

C. Plausible because SI flow will be changed by either gradual repressurization of the RCS or isolation of a break in the ECCS piping.

Incorrect because backpressure will *increase* and will not be immediate if due only to RCS pressure change.

D. Plausible because RVLIS level would reflect refilling of the vessel and is an alternate indication per the ERG Background document

Incorrect because the plausible leak paths (such as letdown or backleakage through ECCS check valves) are too small to produce voiding of the Rx Vessel.

K/A: W/E04 LOCA Outside Containment EK1.3 Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment); Annunciators and conditions indicating signals, and remedial actions

K/A Match: K/A is met because candidate must know which indication (pressure) shows that the remedial action of isolating the leak has corrected the condition.

Selection criteria; no existing question was tied to this K/A. Two questions dealt with indications of successful remediation actions but the other had already selected for the audit exam for this class based on the random sample plan.

Tier: 1 **Group:** 1
Importance Rating: RO 3.5
Technical Reference: EOP-2.5 (Westinghouse ECA-1.2)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-2.5-7

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

56. 000009EK1.01 002/NEW//KNOWLEDGE//RO/SUMMER/9/23/10/NO

Given the following plant conditions:

- A small break loss of coolant accident has occurred.
- All Reactor Coolant Pumps have been stopped.
- Operators are responding using EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION

Which ONE (1) of the choices below completes the following statement?

While natural circulation is occurring ________ will be at saturation temperature for the associated steam generator pressure.

After RCS level decreases to the point that steam voiding occurs in the RCS hot leg, the steam generators will ________ removing heat.

A. T_{hot} stop

B. T_{cold} stop

C. T_{hot} continue

D.✓ T_{cold} continue

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 1 Submitted by Matthew R. Bender based on Duke comments.

Rev. 2 Submitted by MRB based on 2nd validation.
Changed from " the point that natural circulation is disrupted" to "the point that steam voiding occurs in the RCS hot leg".
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because T_{hot} also forms a verification of natural circulation and the ability to remove heat from the core through the steam generators is greatly reduced.

Incorrect because T_{hot} is verified to be stable or decreasing in order to verify natural circulation and not to be at saturation temperature for the steam generator pressure. The second part is incorrect because reflux boiling continues to remove heat through the steam generators.

B. Plausible because the first part is correct and the ability to remove heat from the core through the steam generators is greatly reduced.

Incorrect because reflux boiling occurs and thus transfers some core heat to the steam generators.

C. Plausible because T_{hot} is also investigated to verify the prescense of natural circulation and the second part is correct.

Incorrect because T_{hot} is verified to be stable or decreasing to indicate the presensce of natural circulation.

D. CORRECT. In accordance with EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION, T_{cold} is verified to be at saturation temperature for the pressure of the steam generator to verify natural circulation. If natural circulation is lost the rate that the steam generators can remove heat from the primary decreases, but it is not lost. Reflux boiling occurs in which the hot steam from the core condenses in the U-tubes drains back to the core and thus removes core heat.

K/A: 000009 Small Break LOCA EK1.01 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Natural circulation and cooling, including reflux boiling

K/A Match: The K/A is met because the operator must know that if natural circulation is lost reflux boiling continues to remove core heat.

Selection criteria;

Tier: 1 **Group:**	1	
Importance Rating:	RO	4.2
Technical Reference:	EOP-2.1 (ES-1.2)	

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-2.1-04
10 CFR Part 55 Content: 41(b)14

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

57. 000008AA1.05 002/NEW//HIGHER//RO/SUMMER/9/23/10/NO

Given the following plant conditions:

- 100% power
- A Pressurizer safety failed open.
- The crew has just entered EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION
- RWST level is 80% and decreasing.

Which ONE (1) of the following statements identifies the operator action that was taken with respect to the RHR pumps and the reason for that action?

A. Both RHR pumps were kept running to provide injection flow.

B. Both RHR pumps were kept running to provide suction to the charging pumps.

C. ONE (1) RHR pump was stopped to conserve RWST inventory.

D✓ Both RHR pumps were stopped to prevent damage from miniflow operation.

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

New for 2011 NRC WDB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because in EOP-2.1 RCS pressure will be decreased and RHR pumps will be used to provide injection flow.

Incorrect because at then entry of EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION, RCS pressure is greater than 325 psig and so the RHR pumps are not providing injection flow.

B. Plausible because RHR pumps provide suction to the charging pumps after EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION. If EOP-2.2 had been used to transfer the suction of the charging pumps to the discharge of the RHR pumps the RHR pumps would be currently running.

Incorrect because the RHR pumps are currently aligned to take suction from the RWST and are not providing a suction source to the charging pumps.

C. Plausible because this action is taken in the event of a loss of ECCS recirculation flow in EOP-2.4, LOSS OF EMERGENCY COOLANT RECIRCULATION, for the reason stated.

Incorrect because EOP-2.4, LOSS OF EMERGENCY COOLANT RECIRCULATION, would be entered from EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION, which is entered at 18% level in the RWST. That level has not been reached.

D. CORRECT. Candidate must determine that the low mass loss from a single safety would keep RCS pressure above the 325 psig RHR shutoff head for an extended period (EOP-2.1 cooldown is only 100°F degrees per hour, so saturation pressure will remain above RHR shutoff head for longer than one hour.) Reason is correct per Westinghouse E-1 ERG background document.

K/A: 000008 Pressurizer Vapor Space Accident AA1.05 Ability to operate and/or monitor the following as they apply to the Pressurizer Vapor Space Accident: LPI System

K/A Match: K/A is met because the candidate must determine how the Low Head Safety Injection (LPI/RHR) system is operated during a PZR vapor space accident

Selection criteria; VCS Closed ref. bank EOPS361 also deals with RHR pump operation in EOP-2.1, stem and all distractors are different. New question written for more plausible distractors.

Tier: 1 **Group:** 1
Importance Rating: RO 3.4
Technical Reference: EOP-2.1 (Westinghouse ES-1.2)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-2.1-04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

58. 013A2.01 004/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- The plant was operating at 100% power.
- A large break loss of coolant accident occurred.
- Operators are in the process of establishing Cold Leg Recirculation in accordance with EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION.

Which ONE (1) of the following describes the system(s) that must have their suctions **manually** transferred from the RWST in accordance with EOP-2.2 and what signal must be reset in order to make the transfer(s)?

A.✓ Charging ONLY	Safety Injection ONLY
B. Charging AND Spray	Safety Injection ONLY
C. Charging ONLY	Safety Injection AND Phase A
D. Charging AND Spray	Safety Injection AND Phase A

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 1 Submitted by MRB as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. RHR and Spray automatically swap to the cold leg recirc mode at 18% level and EOP-2.2, (ES-1.3) just verifies that swapped correctly. The charging pumps do not automatically swap and so must be manually aligned. In order to swap the charging pumps they must be secured and so SI has to be reset.

B. Plausible because spray does get transfered from the RWST to the RB sump and the second part is correct.

Incorrect because spray automatically swaps to the sump and does not need to be manually swapped.

C. Plausible because the first part is correct and phase A does reposition a lot of containment valves.

Incorrect. The charging transfer does not require the repositioning of a valve that receives a phase A signal.

D. Plausible because both Charging and spray change alignment and spray does have valves that are opened by a phase A signal.

Incorrect because spray automatically aligns to th RB sump and does not need to manually aligned and it is only necessary to reset safety injection to conduct the swapover.

K/A: 013 Engineered Safety Features Actuation A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; LOCA

K/A Match: the K/A is met because the candidate must use transfer to cold leg procedure to determine the charging pumps must be manually swapped, which requires that the SI signal must be reset.

Selection criteria; only one existing bank question (ESFAS 40) was tied to this K/A. It was a low level "what is the function of the ESFAS" which did not meet the K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 4.6
Technical Reference: EOP-2.2 TRANSFER TO COLD LEG RECIRCULATION (Westinghouse ES-1.3) AB-10 EMERGENCY CORE COOLING SYSTEM

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-10-20

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

59. 000040EA1.2 003/NEW//KNOWLEDGE//RO/SUMMER/12/1/10/NO

Given the following plant conditions:

- An uncontrolled rapid depressurization of steam generators is occurring
- Reactor Trip and Safety Injection have occurred

Which ONE (1) of the following describes the time in core life that would more likely result in a return to criticality after the trip and the indication that will result in a RED path on the Subcriticality Critical Safety function?

A.✓ End Of Life
5% Power Range Level

B. End of Life
Intermediate Range SUR positive

C. Beginning of Life
5% Power Range Level

D. Beginning of Life
Intermediate Range SUR positive

QUESTION USAGE:

RO NRC exam 2011

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.

Rev. 1 Submitted by Matthew R. Bender based on RJ comments.
Changed stem from "will aid in returning the core to a shutdown conditions" to increase readability.

Rev. 2 Submitted by Matthew R. Bender based on RJ comments changed second part of question to red path criteria.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. Per ECA-2.1Background document "HP plants without a BIT (or BIT removed or boron concentration reduced) should be aware of the potnetial for Return to Criticality (RTC) for cooldown events such as those described here. This concern is highest near the end of core life (EOL) when the Moderator Temperature Coefficient (MTC) is most negative;" The second half is correct per EOP-12.0, MONITORING OF CRITICAL SAFETY FUNCTIONS, Attachment 1.

B. Plausible because the first part is correct and this condition would lead to a orange path.

   Incorrect because the RED path is power range not less than 5%.

C. Plausible because the worst case scenario takes place at the EOL and it is a common student mistake to think that the worst case is at the BOL. The second half is plausible because it is correct.

   Incorrect because the worst case is at the EOL and not the BOL.

D. Plausible because it is a common student mistake that the worst case is at the BOL and this is is a condition that would cause a Orange path on the Subcriticality Safety function.

   Incorrect because the worst case is at the EOL and the RED path is entered when power level is greater than 5% power range level.

K/A: 000040 (W/ E12) Steamline Rupture-Excessive Heat Transfer EA1.2 Ability to operate and/or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Operating behavior characteristics of the facility.

K/A Match: K/A is met because the likelyhood of a return to criticallity during an uncontrolled depressurization of all Steam Generatorsis an operating characteristic of the facility

Selection criteria; no existing questions were tied to this K/A.

Tier: 1 **Group:** 1
Importance Rating: RO 3.6
Technical Reference: EOP-3.1 (Westinghouse ECA-2.1), TS 3.1.2.6,

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-3.1-07

10 CFR Part 55 Content: 41(b)1

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments;

60. W/E13EK3.4 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/3/11/NO

A reactor trip has occurred. The crew has entered EOP-15.1, RESPONSE TO STEAM GENERATOR OVERPRESSURE, based upon a **YELLOW** condition on the Heat Sink CSF Status Tree. The following conditions exist:

- SG 'A' pressure indicates 1250 psig.
- SG 'B' and 'C' pressures indicate 1110 psig.
- SG 'A' NR level is 65%.
- Instrument air header pressure has been lost.

Which ONE (1) of the following actions is required to mitigate the SG overpressure condition in accordance with EOP-15.1?

A. Place "A" SG Power Relief controller in PWR RELIEF mode and adjust the controller setpoint to reduce affected SG pressure.

B. Place Steam Dump Controller in MANUAL in the STEAM PRESSURE mode, adjust the controller to reduce affected SG pressure.

C. Start the TDEFW Pump to reduce SG pressure.

D✓ Locally operate the "A" SG PORV to reduce SG pressure.

QUESTION USAGE:

RO 2011 NRC
2006 VCS Retake License Exam

QUESTION HISTORY: (as EOPS 572)

Rev. 1 (wdb 1/3/11) Changed level in stem to 85% for "A" SG to make different pressures more plausible. Changed "A" from "Initiate SG Blowdown flow to reduce SG pressure by reducing SG level." since that action is not in the FRG and is unlikely to reduce pressure if not solid. Also provided more symmetry with "B". Changed "and increase demand" in "B" to "reduce affected SG pressure" to match wording in EOP.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this is the method in EOP-15.1 (WOG FR-H.2) step 4 RNO.

Incorrect because SG PORVs will not operate without Instrument air.

B. Plausible because this is the method in EOP-15.1 (FR-H.2) step 4.

Incorrect because condenser steam dumps will not operate without Instrument air.

C. Plausible because this is an alternate method in EOP-15.1 (FR-H.2) step 4 RNO for high pressure in the "B" or "C" Steam Generators. (NOTE; the supply valve to the TDEFW pump, FCV-2030, fails open on loss of air but has an air accumulator that keeps it closed on loss of Instrument Air until manually opened)

Incorrect because the "A" SG does not supply the Terry Turbine.

D. CORRECT per EOP-15.1 (FR-H.2) step 8.

K/A: W/E13 Steam Generator Over-Pressure EK3.4 KNOWLEDGE of RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.

K/A match; K/A is met because the candidate must analyze which actions by the RO would adhere to the procedure for the given conditions.

Selection criteria; four bank questions dealt with EOP-15.1 (FR-H.2). Two were "entry conditions", which, as a yellow path procedure, are not RO knowledge. The other FR-H.2 question had similar content regarding actions but required knowledge of the sequence, which is more SRO knowledge than the system knowledge this question is based on.

Tier: 1 **Group:** 2
Importance Rating: RO 3.1
Technical Reference: EOP-15.1 (Westinghouse FR-H.2)

Proposed references to be provided to applicants during examination: None

Learning Objective: 2108

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

61. W/E15EA1.3 002/MOD//KNOWLEDGE//RO/SUMMER/5/9/11/NO

Which ONE of the following is the **FIRST** Major Action Category in EOP-17.1, REACTOR BUILDING FLOODING and reason for this in accordance with the background document?

A.✓ Identify and isolate unexpected sources of water in the RB to mitigate flooding that could damage plant equipment.

B. Check for and isolate faulted steam generator to mitigate flooding that could damage plant equipment.

C. Notify TSC personnel of sump level, chemistry, and activity level to determine a strategy to transfer excess water out of containment.

D. Have chemistry evaluate sump chemistry, and activity level to determine changes in the planned transition to cold and hot leg injection.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY: (as EOPS 441)

Rev. 0 Submitted by Matthew R. Bender as a significant modification of EOPS 441
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per EOP-17.1 (FR-Z.2)

B. Plausible because a MSLB will add water to the RB sump and this is a Major action for EOP-17.0 RESPONSE TO HIGH REACTOR BUILDING PRESSURE (FR-Z.1).

Incorrect because a MSLB should not raise water high enough to enter this procedure.

C. Plausible because this is the *second* Major action in EOP-17.1 (FR-Z.2).

Incorrect because it is not the *first* action.

D. Plausible because chemistry will be contacted in this FRP.

Incorrect because the reason for the contact is wrong and it is the second MAC not the first.

K/A: W/E 15 Containment Flooding EA1.3 Ability to operate and/or monitor the following as they apply to the (Containment Flooding): Desired operating results during abnormal and emergency situations.

K/A Match: The K/A is met because the candidate must know the first major action and the desired operating result of preventing damage to plant equipment due to flooding of containment.

Selection criteria; only two bank questions referenced the EOP for containment flooding. The other question (determine which Service Water train is leaking) was used on this class's Audit examination.

Tier: 1 **Group:** 2
Importance Rating: RO 2.8
Technical Reference: EOP-17.2 step 3, Westinghouse Background Document for FRG-Z.1 and Z.2.

Proposed references to be provided to applicants during examination: None

Learning Objective: 2182

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

62. 000022G2.4.11 002/MOD//HIGHER//RO/SUMMER/9/23/10/NO

Given the following plant conditions:

- 100% power.
- The 'A' charging pump is in service.
- The following alarms are received on the Main Control Board:
  - REGEN HX LTDN OUT TEMP HI
  - RCP A (B) (C) #1 SL INJ FLO LO
  - CHG LINE FLO HI/LO
- **NO** other alarms are in at this time.

Which ONE (1) of the following malfuntions on the 'A' charging pump could be the cause of the abnormal conditions and what will AOP-102.2, LOSS OF CHARGING, require **IMMEDIATELY** after ensuring the 'A' charging pump is secured?

A. A sheared shaft
Start another charging pump.

B.✔ A sheared shaft
Close all letdown isolation valves.

C. A ground on motor causes the 50G relay to actuate
Start another charging pump.

D. A ground on motor causes the 50G relay to actuate
Close all letdown isolation valves.

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 0 Significantly modified from CVCS 5 by Matthew R. Bender
Changed to a 2X2 to require next action and changed pump tripped to overcurrent on pump to make more plausible (in order for pump trip to be plausible it must be thought that a pump trip annunciator does not exist).

Rev. 1 Submitted by Matthew R. Bender based on RJ comments.
Changed A and B from "An overcurrent" to"ground on motor" to increase plausibility.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is correct and AOP-102.2 will eventually start another charging pump to replace the 'A' charging pump.

   Incorrect because the next action is to isolate letdown.

B. CORRECT. A sheared shaft of the 'A' charging pump would give these indications of a loss of charging. It is not expected that the 'A' charging pump will trip since current will go down due to the sheared shaft requiring the crew to secure it. The procedure step immediately following the step to ensure that the pump is secured is to isloate letdown.

C. Plausible because all of the annunciators that are present would be in alarm for an a ground of the motor and AOP-102.2 does eventually start another charging pump.

   Incorrect because XCP-614, 3-2 CHG PP A/C TRIP would also be present for the ground and the next action is to secure letdown.

D. Plausible because all of the annunciators that are in would be present for a ground on the 'A' charging pump and the second part is correct.

   Incorrect because CP-614, 3-2 CHG PP A/C TRIP would also be present.

K/A: 000022 Loss of Rx Coolant Makeup G2.4.11 Knowledge of abnormal condition procedures.

K/A Match: the K/A is met because the candidate must know the next step in the AOP for the loss of rx coolant makeup (ie charging)

Selection criteria;
New question.

Tier: 1 Group: 1
Importance Rating: RO 4.0
Technical Reference: AOP-102.2 LOSS OF CHARGING, XCP-614 pt 3-2 CHG PP A/C TRIP

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-102.2 02, 04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

63. 000025AK1.01 003/NEW//KNOWLEDGE//RO/SUMMER//NO

Given the following plant conditions:

- The reactor was in Mode 4 on 'A' Train RHR cooling.
- A loss of RHR cooling occurred ONE (1) hour ago.
- The crew has entered AOP-115.3, LOSS OF RHR WITH THE RCS INTACT
- RCS T_{hot} is 295°F and rising
- RCS Wide Range Pressure is 380 psig and rising

Which ONE (1) of the following answers contains **BOTH** the RCS temperature **AND** pressure values at which maximum **operating limits** for the RHR system piping will be reached in accordance with AOP-115.3?

A. 300°F; 400 psig

B. 300°F; 425 psig

C. 350°F; 400 psig

D✓ 350°F; 425 psig

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 0 Submitted by MRB as a new/significantly modified. (although there is a number of questions that test the 425 psig setpoint this question is different in that it tests the 425 psig and the 350°F)

Rev. 1 Submitted by MRB based on 2nd validation. Added maximum to the stem.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because 300°F is the temperature below which an alarm on the MCB is recieved if the suction valves to the RHR system are not open (XCP-610 2-5, RCS TEMP LO AND RHR SUCT VLV NOT OPEN) and 400 psig is the pressure that GOP-6 and GOP-2 uses to place and remove RHR from service.

   Incorrect because these are below the operating limits for the RHR system piping.

B. Plausible because 300°F is the temperature below which an alarm on the MCB is recieved if the suction valves to the RHR system are not open (XCP-610 2-5, RCS TEMP LO AND RHR SUCT VLV NOT OPEN) and the second part is correct.

   Incorrect because the temperature limit is 350°F and not 300°F.

C. Plausible because the first poart is correct and 400 psig is the pressure that GOP-6 and GOP-2 uses to place and remove RHR from service.

   Incorrect because the pressure limit is 425 psig and not 400 psig.

D. CORRECT. AOP-115.3, LOSS OF RHR WITH THE RCS INTACT, step 2 and 3 look for maximum temperature and pressure of RCS for RHR and uses 425 psig and 350°F as the operating limits.

K/A: 000025 Loss of RHR System AK1.01Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation

K/A Match: the K/A is met because the operational impact of loss of RHR is that the RCS will heatup and pressurize and so temperature and pressure may reach a point that RHR cannot be placed in service even if it is returned to an operable condition.

Tier: 1 **Group:** 1
Importance Rating: RO 3.9

Selection criteria;

Technical Reference: AOP-115.3

Proposed references to be provided to applicants during examination:

Learning Objective: AOP-115.3-04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

64. 076K3.05 002/NEW//KNOWLEDGE//RO/SUMMER/1/25/11/NO

Given the following plant conditions:

- The RCS is at 225°F shutting down for a refueling.
- ONE (1) train of RHR is in service.
- An earthquake has caused the loss of Lake and Service Water Pond levels.
- All Service Water Pumps have been stopped.
- The crew is performing AOPs 117.1, TOTAL LOSS OF SERVICE WATER, and 118.1, TOTAL LOSS OF COMPONENT COOLING WATER.
- RCS temperatures are stable.

Which ONE (1) of the following statements identifies the initial overall strategy for RCS temperature control?

A. Establish cold leg injection.

B. Dump steam to the condenser.

C. Operate both Component Cooling Water and Residual Heat Removal loops.

D✓ Alternate operation of Component Cooling Water and Residual Heat Removal loops.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

new for 2011 (wdb 1/25/11)

Rev.1 (wdb 4/11/11) changed temperature in first bullet from 235°F to 225°F per TL feedback, RHR not usually placed in service before 230°F.

Rev. 2 Submitted by Matthew R. Bender based on RJ comments
Changed C from verify to ensure so that it is a strategy.
Added the fact that only one RHR train is in service.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this could be done in AOP-115.3 due to the upcoming loss of RHR ultimate heat sink.

   Incorrect since AOP-115.3 would not be entered with RCS temperatures stable.

B. Plausible because temperature is high enough to create steam.

   Incorrect since the loss of Lake level would remove Circ Water flow and block condenser dumps due to high condenser pressure (C-9)

C. Plausible because this would maximize heat removal in the short term.

   Incorrect since the procedure alternates trains to minimize heat input from the CCW and RHR pumps.

D. CORRECT per AOP-117.1 step 14 pg. 6 of 7. Alternating CCW requires alternating RHR loops due to loss of cooling to the RHR HX from an idle CCW loop.

K/A: 076 Service Water K3.05 Knowledge of the effect that a loss or malfunction of the SWS will have on the following: RHR components, controls, sensors, indicators, and alarms, including rad monitors

K/A Match: the K/A is met because the candidate must know how the RHR system will be operated to minimize the loss of the ultimate heat sink from the SWS.

Selection criteria; CVCS 24 was mistakenly tied to this K/A. No other bank questions were tied to this K/A. New question written to match K/A.

Tier: 2 **Group:** 1
Importance Rating: RO 3.0
Technical Reference: AOP-117.1

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-177.1-04

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

65. 000065AA1.03 003/NEW//KNOWLEDGE//R0/SUMMER/12/6/10/NO

Given the following plant conditions:

- Plant initially at 100% Power
- A break occurred in the Instrument Air System
- The crew entered AOP-220.1, LOSS OF INSTRUMENT AIR, due to lowering Instrument Air Pressure
- Operators manually tripped the reactor
- Instrument Air pressure was lost for 2 hours.
- The cause of the loss of Instrument air has been corrected.
- Operators have begun restoration of systems to normal

Which ONE (1) of the choices below contain both of the following:

1) A component that is being manually controlled LOCALLY as directed by AOP-220.1.

2) A valve that was gagged shut during the performance of AOP-220.1.

A. 1)Excess Letdown Flow Control Valve (HCV-137, XS LTDN HX)
2)PVG-3105A – FS TO DG A

B. 1) Excess Letdown Flow Control Valve (HCV-137, XS LTDN HX)
2) XVG09627A SW SYS OUTLET HDR CC LOOP A XCONN VALVE

C. 1)Motor Driven Emergency Feed Pump Flow Control Valve FCV-3531
2)PVG-3105A – FS TO DG A

D.✓ 1)Motor Driven Emergency Feed Pump Flow Control Valve FCV-3531
2)XVG09627A SW SYS OUTLET HDR CC LOOP A XCONN VALVE

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.

Rev. 1 Submitted by MRB based on 2nd validation.
Changed time that air pressure was lost from 20 minutes to 2 hours to not have candiate guess on whether a distractor is wrong based on there was not enough time to complete the actions of the AOP yet.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because HCV-137 is throttled in AOP-220.1 when excess letdown is placed in service and PVG-3105A is an air operated valve that is capable of being gagged.

   Incorrect because HCV-137 is throttled from the MCB and not locally, and PVG-3105A fails as is without air and so is not gagged per AOP-220.1.

B. Plausible because HCV-137 is throttled in AOP-220.1 when excess letdown is placed in service and the second part is correct.

   Incorrect because this valve is throttled from the MCB and not locally.

C. Plausible because this valve is throttled in AOP-220.1 and PVG-3105A is an air operated valve that can be gagged.

   Incorrect because PVG-3105A fails as is on a loss of air and so AOP-220.1 does not gag it.

D. CORRECT. FCV-3531 is manually throttled in step 9 of AOP-220.1 and XVG0927A is gagged in step 5 of AOP-220.1.

K/A: 000065 Loss of Instrument Air AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Restoration of systems served by instrument air when pressure is regained

K/A Match: The K/A is met because the operator must know what actions are required when instrument air pressure is regained.

Selection criteria; No existing question were tied to this K/A. All existing questions for loss of Instrument Air dealt with system response or recovery options, not restoration. Only one restoration step is provided in the AOP.

Tier: 1 **Group:** 1
Importance Rating: RO 2.9
Technical Reference: AOP-220.1

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-220.1-6

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

66. 079A4.01 002/NEW/VCS CLOSED/HIGHER//RO/SUMMER/1/31/11/NO

Given the following plant conditions:

- XAC-3A, INSTR AIR CMPR A, is running
- A forklift has struck a tool manifold and causing a loss of Service Air pressure.
- Operators are monitoring Instrument Air header pressure in the Control Room

Instrument air header pressure will be maintained by XAC-3B, INSTR AIR CMPR B, starting at __________ and by IPV-8324, STATION AIR SUPPLY HDR PRESS CONT VALVE fully closing at ___________.

	XAC-3B start	IPV-8324 fully closes
A.	70 psig	60 psig
B.	90 psig	80 psig
C.	70 psig	80 psig
D✓	90 psig	60 psig

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011 (wdb 1/31/11)

Rev. 1 Submitted by MRB based on 2nd validation.
Changed nomenclature of air compressor from generic standby to specifically B. Easy to misread standby with supplemental.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the second part is right and the *Supplemental* air compressor does start at 70 psig.

   Incorrect since the standby IA compressor starts at 90 psig.

B. Plausible because the first part is right and 80 psig is the setpoint for XCP-607 point 2-5 INSTR AIR PRESS LO FLO HI

   Incorrect since IPV-8324 throttles closed from 100 psig to 60 psig.

C. Plausible because the second part is right and the *Supplemental* air compressor does start at 70 psig.

   Incorrect since the standby IA compressor starts at 90 psig.

D. CORRECT per SOP-220 Encl. A pg. 1 and SOP-221 Encl. A pg. 1

K/A: 079 Station Air A4.01 Ability to manually operate and/or monitor in the control room: Cross-tie valves with IAS

K/A Match: the K/A is met because the candidate must evaluate plant operation with the IA/RBIA cross-tie valve open.

Selection criteria;

Tier: 2 **Group:**	2
Importance Rating:	RO 2.7
Technical Reference:	SOP-220, STATION AND BACKUP INSTRUMENT AIR SYSTEMS

Proposed references to be provided to applicants during examination: None

Learning Objective: TB-12-18

10 CFR Part 55 Content: 41(b)4

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comment:

67. 059G2.4.11 001/BANK/VCS CLOSED/HIGHER//RO/SUMMER/1/19/11/NO

Initial Plant conditions:

- Plant startup in progress
- Reactor Power is 55%
- Turbine load is constant
- 'A' and 'B' feedwater pumps running

Current Plant conditions:

- All SG levels have just begun to decrease at the same rate
- 'A' and 'B' feedwater pumps running

Which ONE (1) of the following statements identifies the **FIRST** operator action required by the applicable Abnormal Operating Procedure?

A. Take all three feed reg. valves to manual.

B. Start the idle feedwater pump.

C. Select the operable feedwater flow channels for the affected S/Gs.

D✓ Manually control feedwater pump speed.

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

AOPS109 with editorial changes. (wdb 1/19/11). Placed stem in standard format. Changed power from "70%" to "55%" to be consistent with having two feedwater pumps in service (GOP-4a step 3.16) so as to make B. more plausible. Added "at same rate" to stem to rule out controlling steam flow failure, which also feeds into the SG feed pump speed control circuit. Added "first" to stem to further rule out B., which is a subsequent action after a feed pump trip.

Rev. 2 Submitted by RJ
Changed layout. Added status of feedwater pumps. Removed no rod motion.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this applies the immediate action of AOP-210.1 to all three FRVs since all three SGs are affected.

Incorrect because that AOP is intended for a condition affecting one FRV; it will probably be ineffective for a pump problem affecting all three SGs.

B. Plausible because this is a subsequent action in the correct AOP for a feed pump malfunction if a feed pump had tripped and flow is decreasing.

Incorrect because it is not the *first* action and there is no indication of a pump trip in the stem.

C. Plausible because this is an immediate action in AOP-410.3 for steam/feed flow channel failures.

Incorrect because an individual SG steam flow failure would affect one SG more than the others.

D. CORRECT per AOP-210.3.

K/A: 059 Main Feedwater G2.4.11 Knowledge of abnormal condition procedures.

K/A Match: K/A is met because the operator must recognize which AOP to enter (main feed pump problem common to all SGs versus feed reg valve problem affecting only one) and the immediate actions for that AOP

Selection criteria; No existing bank questions were tied to this K/A. 15 questions referenced Feedwater Abnormal Operating Procedures. Most where system response (instrument failure) questions that did not address specific steps in the AOPs. AOPS 107 had actions but was avoided due to negative construction (EXCEPT). FW150 had actions but was already selected for the RO audit. The selected question was used since it is concerned AOP entry conditions and was therefore clearly RO level.

Tier: 2 **Group:** 1
Importance Rating: RO 4.0
Technical Reference: AOP-210.3 Feedwater Pump Malfunction

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-210.3-03

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

68. 000077AK3.02 005/NEW//HIGHER//RO/SUMMER/12/7/10/NO

Given the following plant conditions:

- A grid disturbance has been reported by the System Controller.
- 230 KV system voltage is 230.9 KV and rising
- Main Generator Frequency is 60.5 Hertz and rising
- The crew is implementing AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES.

Which ONE (1) of the following describes the **IMMEDIATE** concern associated with a rising system frequency as identified in AOP-301.1?

A. turbine overspeed

B. system over-voltage

C. generator volts/hertz

D✓ positive reactivity addition

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 New MRB 7/8/2011
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because higher frequencies do indicate a higher speed of the turbine.

   Incorrect because frequency is not high enough to be close to the overspeed trip (109.5%) and the AOP specifically calls out positive reactivity addition.

B. Plausible because voltage is used to determine the operability of the 230 kV power supply, and as the turbine speeds up the voltage generated is increased.

   Incorrect because the maximum limit for the 230 KV bus is 239.6 KV and current voltage is well within the operability band and the AOP states that the reactivity addition should be closely monitored.

C. Plausible because the grid disturbance is affecting voltage and frequency which the main generator has a limiter and trip associated with.

   Incorrect because the volt/hertz function although present at power is more of a concern at low loadings on the generator.

D. CORRECT. Caution for AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES, states, "Reactor Power should be monitored closely due to the positive reactivity effects of increased RCS flow rates caused by sudden increases of grid frequency."

K/A: 000077 Generator Voltage and Electric Grid Disturbance AK3.02 Knowledge of the reasons for the following responses as they apply to Generator Voltage and Electric Grid Disturbances: Actions contained in abnormal operating procedure for voltage and grid disturbances

K/A Match: the K/A is met because the candidate must know the reason for power reduction actions in the abnormal operating procedure for grid disturbances

Selection criteria; No bank questions were tied to this K/A. of the bank questions referencing AOP-301.1, two were SRO and the RO question had already been selected for the 2011 Audit exam based on the random sample plan.

Tier: 1 **Group:** 1
Importance Rating: RO 3.6 SRO
Technical Reference: AOP-301.1

Proposed references to be provided to applicants during examination: None.

Learning Objective: AOP-301.1-06

10 CFR Part 55 Content: 41(b)10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments;

69. 000059AK1.01 003/NEW//KNOWLEDGE//RO/SUMMER/12/21/10/NO

Given the following plant conditions:

- An accidental transfer of Liquid Radwaste to the Condensate Storage Tank has occured.
- The tank has been recirculated and sampled.

Which ONE (1) of the following is the limit for activity contained in the tank in accordance with Technical Specification 3.11.1 Liquid Effluents/ Liquid Holdup Tanks?

A. 1 microcuries per gram DOSE EQUIVALENT I-131

B. 10 microcuries per gram DOSE EQUIVALENT I-131

C.✓ 10 Curies excluding tritium and dissolved or entrained noble gases

D. 100 Curies excluding tritium and dissolved or entrained noble gases

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

New for 2011. MRB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because discharges are affected by concentration of radionuclides and iodine is a common concern with radiological releases and this is the limit for I-131 in the primary per Technical Specification 3.4.8.

Incorrect because the limit is 10 and is on total curie contant and not iodine.

B. Plausible because Iodine is a common concern with radiological releases and 10 is the actual limit

Incorrect because the limit is based on total radioactive content excluding tritium and dissolved/entrained noble gases and not iodine.

C. CORRECT per Technical Specification 3.11.1.

D. Plausible because the limit is on total activity excluding tritium and dissove or entrained noble gases, and primary activity does have a limit of 100 over Ebar and Ebar is approximately 1.

Incorrect because the technical specification limit is 10 curies and not 100 curies.

K/A: 000059 Accidental Liquid Radwaste Release_AK1.01 Knowledge of the operational implications of the following concepts as they apply to Accidental Liquid Radwaste Release: Types of radiation, their units of intensity and the location of the sources of radiation in a nuclear power plant

K/A Match: The K/A is met because the candidate must determine which type of radioactivity is acceptable for the given plant location.

Selection criteria; No existing bank question was tied to this K/A. New question written to match K/A.

.

Tier: 1 **Group:** 2
Importance Rating: RO 2.7
Technical Reference: Technical Specification 3.11.1.4

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-16-19

10 CFR Part 55 Content: 41(b)13

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

70. 000058G2.2.36 003/NEW//HIGHER//RO/SUMMER/12/3/10/NO

Given the following plant conditions:

- RCS temperature is 250°F
- Maintenance is required on XBC 1B, DC DISTRI BUS 1B BATTERY CHARGER, that will require taking the charger out of service for **2 hours**
- XBC 1A-1B, BACKUP BATTERY CHRG, is not available.
- XBC 1A, DC DISTRI BUS 1A BATTERY CHARGER, is available.

Which ONE (1) of the following choices below answers the following:

1) The **HIGHEST** MODE that this maintenance can be performed in without entering a Technical Specification action statement?

2) The action required by Technical Specifications if the maintenance must be done in the **CURRENT** mode?

A. 1) MODE 4

2) Declare 1B battery inoperable immediately

B. 1) MODE 5

2) Declare 1B battery inoperable immediately

C. 1) MODE 4

2) Demonstrate operability of 1B battery within 1 hour

D✓ 1) MODE 5

2) Demonstrate operability of 1B battery within 1 hour

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 0 Submitted by MRB as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because some Technical Specifications have APPLICABILITY in MODES 1,2, and 3 (feedwater isolation valves, 3.7.1.6 is an example). The battery charger keeps the battery from draining and without a charger the battery starts discharging.

   Incorrect because the applicability is MODES 1,2,3 and 4 and the action is to perform a surveillance on the battery within one hour.

B. Plausible because the MODE is correct and without a battery charger the battery will start to drain.

   Incorrect because the action if the battery charger is inoperable is to perform a surveillance within one hour.

C. Plausible because some technical specifications have APPLICABILITY in MODES 1,2, and 3 (feedwater isolation valves, 3.7.1.6 is an example) and the second part is correct.

D. CORRECT. APPLICABILITY for TS 3.8.2.1 is MODES 1,2,3 and 4 and the action statement b states, "With one of the required full capicity chargers inoperable, demonstrate the OPERABILITY of its associated batter bank by performing Surveillance Requirement 4.8.2.1.a.1 within one hour, and at least once per 8 hours thereafter. If any Category A limit in Table 4.8-2 is not met, delcare the battery inoperable."

K/A: 000058 Loss of DC power G2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

K/A Match: The K/A is met because the candidate must analyze the effect of a degraded power source on the Limiting Condition for Operation

Selection criteria; No existing bank questions were tied to LCOs at the RO level (two SRO operability calls found, not RO knowledge.

Tier: 1 **Group:** 1
Importance Rating: RO 3.1 SRO
Technical Reference: Technical Specification 3.8.2.1

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-3-18

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

71. 005K3.01 003/NEW//HIGHER//RO/SUMMER//NO

Given the following plant conditions:

- The plant is in MODE 4
- 'A' RHR train is in service
- 'B' RHR train is operable
- Steam bubble in the Pressurizer
- RCS Wide Range pressure is 310 psig
- FCV-122, CHG FLOW, is in manual
- Dilution in progress
- All RCPs are stopped

Which ONE (1) of the following describes an expected parameter trend if the running RHR trips and an action required by Technical Specifications?

A.✓ Pressurizer level rises
Immediately stop the dilution

B. Pressurizer level rises
Stop the dilution within one (1) hour

C. RCS pressure lowers
Immediately stop the dilution

D. RCS pressure lowers
Stop the dilution within one (1) hour

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
Rev. 1 Submitted by MRB based on 2nd validation.
Added FCV-122 in manual to stem.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT. With charging still occuring and RHR pump discharge head no longer driving low pressure letdown, pressurizer level will lower. Technical specification 3.4.1.3 action b states, "With no Reactor Coolant or RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

B. Plausible because pressurizer level will rise and Technical Specification 3.4.1.3 states, "All Reactor Coolant pumps and decay heat removal pumps may be de-energized for up to 1 hour provided 1) no operations are permited that would cause dilution fo the Reactor Coolant System boron concentration, and 2) core outlet temperature is maintained at least 10°F below saturation temperature."

   Incorrect because although no RCS flow is allowed for up to an hour dilution is not allowed to occur without RHR or RCP flow.

C. Plausible because letdown flow still exists and the trip of the RHR pump will affect the response of PCV-145, LO PRESS LTDN, which is used to control RCS pressure and the second part is correct.

   Incorrect because PCV-145 responds to pressure at the discharge of the RHR pump and when the pump trips the discharge pressure of the pump is lost. PCV-145 will close in an attempt to raise pressure. With charging still in service and loss of letdown flow pressure will rise.

D. Plausible because letdown flow still exists and the trip of the RHR pump will affect the response of PCV-145, LO PRESS LTDN, which is used to control RCS pressure and Technical Specifications allows operation without RHR or RCS flow for up to an hour in MODE 4.

   Incorrect because PCV-145 responds to pressure at the discharge of the RHR pump and when the pump trips the discharge pressure of the pump is lost. PCV-145 will close in an attempt to raise pressure. With charging still in service and loss of letdown flow pressure will rise. The second part is incorrect because the action statement says to stop all dilution with no RHR pumps or RCPs in service.

K/A: 005 Residual Heat Removal K3.01 Knowledge of the effect that a loss or malfunction of the RHRS will have on the following: RCS

K/A Match: the K/A is met because the candidate must know the indications (effects) on the RCS of a loss of RHR.

Selection criteria; Significantly modified.

Tier: 2 **Group:** 1
Importance Rating: RO 3.9
Technical Reference: AB-7

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-7-20

10 CFR Part 55 Content: 41(b)14

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

72. 000017AK2.10 004/NEW//KNOWLEDGE//RO/SUMMER/6/6/2011/NO

Given the following plant conditions:

- 8% power
- 'A' RCP lower seal water outlet temperature is 200°F and rising

Which ONE (1) of the following correctly identifies:

1) The seal water outlet temperature at which the RCP MUST be stopped

2) The MODE in which it can be restarted after the cause of high temperature is corrected?

A. 235°F
The RCP can be restarted in the current MODE

B. 311°F
The RCP can be restarted in the current MODE

C.✓ 235°F
The plant must in MODE 3 or lower to restart the RCP

D. 311°F
The plant must in MODE 3 or lower to restart the RCP

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is correct and all three reactor coolant loops must be in operation in MODE 1 per Technical Specification 3.4.1.1.

Incorrect because the action statement for 3.4.1.1 states to be in at least HOT STANDBY within 1 hour. It does not state to return to operable status or be HOT STANDBY. Also SOP-101, REACTOR COOLANT SYSTEM, Precaution 4 states "Do not restart a tripped Reactor Coolant Pump unless the plant has been shut down to Mode 3 or below."

B. Plausible because 311°F is the trip setpoint of the motor stator and all three reactor coolant loops must be in operation in MODE 1 per Technical Specification 3.4.1.1.

Incorrect because the trip setpoint is 235°F and SOP-101, REACTOR COOLANT SYSTEM, Precaution 4 states "Do not restart a tripped Reactor Coolant Pump unless the plant has been shut down to Mode 3 or below."

C. CORRECT. This is the trip setpoint for seal water outlet temperature and SOP-101, REACTOR COOLANT SYSTEM, Precaution 4 states "Do not restart a tripped Reactor Coolant Pump unless the plant has been shut down to Mode 3 or below."

D. Plausible because this is the correct mode that restart of the pump can occur at and this is the temperature at which the motor stator temperature would call for a pump trip.

Incorrect because the trip setpoint is 235°F.

K/A: 000017AK2.10 Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP indicators and controls

K/A Match: the K/A is met because the operator must know the relation the indication of seal water outlet temperature that will cause the crew to trip the pump causing a loss of RC flow and relate when the controls for the RCP can be used to restart the pump.

Selection criteria;

Tier: 1 **Group:** 1
Importance Rating: RO 2.8
Technical Reference: AB-4

Proposed references to be provided to applicants during examination: None

Learning Objective: AB-4-20

10 CFR Part 55 Content: 41(b)3

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

73. 000003AK1.21 003/NEW//HIGHER/4/RO/SUMMER/9/21/10/NO

Given the following plant conditions:

- 100 % Power
- Plant is operating in Relaxed Axial Offset Control (RAOC)
- All rods were full out.
- Control Rod P-8 dropped to 96 steps.
- No operator actions have been taken.
- Delta flux indications are as follows:

Before the Drop		After the drop
N41	-4.4%	-3%
N42	-4.4%	-3%
N43	-4.4%	-9.1%
N44	-4.4%	-9.1%

Which ONE (1) of the following choices completes the statements below?

AFD is currently __________ the Technical Specification 3.2.1 limits.

The BOP should adjust Main turbine load to maintain T_{avg} within a **MAXIMUM** of ___________ of T_{ref}.

REFERENCE PROVIDED

A. within +/- 1.5°F

B. outside of +/- 1.5°F

C. within +/- 5°F

D✓ outside of +/- 5°F

PROVIDE COPY OF Curve Book Figure I-1,

QUESTION USAGE:

2011 RO NRC

QUESTION HISTORY:

New for 2011 NRC exam

Rev. 1 Submitted by MRB based on 2nd validation
Seperated fill in the blank to two sentences to indicate that question does not want delta I after the rod adjustment.
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because this is the normal band that Tave is kept within Tref and two of the four channels are within the specification.

   Incorrect because AOP-403.5, STUCK OR MISALIGNED CONTROL ROD, step 4 (continuous action) states to maintain Tavg within 5°F of Tref, and the specification is considered out of band with two out of the four channels out of band.

B. Plausible because this is the normal band that Tavg and Tref are kept within and the first part is correct.

   Incorrect because AOP-403.5, STUCK OR MISALIGNED CONTROL ROD, step 4 (continuous action) states to maintain Tavg within 5°F of Tref.

C. Plausible because the second part is correct and two of the four channels are within the limits.

   Incorrect because 4.2.1.2 states "The indicated AFD shall be considered outside of its limits when two or more OPERABLE excore channels are indicating the AFD to be outside the limits.

D. CORRECT. AOP-403.5, STUCK OR MISALIGNED CONTROL ROD, step 4 (continuous action) states to maintain Tavg within 5°F of Tref and TS Surveillance 4.2.1.2 states "The indicated AFD shall be considered outside of its limits when two or more OPERABLE excore channels are indicating the AFD to be outside the limits. At 100% power the limts are -8 to +8 and so N43 and N44 are both out of limits.

K/A: 000003 Dropped Control Rod AK1.21 Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Delta flux (Δ I).

K/A Match: The KA is met because the operator must determine the expected response of the four delta I meters to a partially dropped rod

Selection criteria; No existing bank question met this K/A (most were QPTR vs. Δ I). New question written to match K/A.

Tier: 1 **Group:** 2
Importance Rating: RO 2.7
Technical Reference: Tech Spec 3.2.1.1 POWER DISTRIBUTION LIMITS, Station curve book

Proposed references to be provided to applicants during examination: curve of Δ I limit versus power Curve Book Figure I-1

Learning Objective: IC-8-39

10 CFR Part 55 Content: 41 (b) 5,10

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments;

74. 2.2.35 002/NEW//KNOWLEDGE//RO/SUMMER/2/3/11/NO

Which ONE (1) of the following statements identifies the **HIGHEST** K_{eff} range and **HIGHEST** T_{avg} that can exist when the Rx Vessel head bolts are detensioned in accordance with Technical Specifications?

A.✓ less than or equal to 0.95 and less than or equal to 140°F

B. less than or equal to 0.95 and less than or equal to 200°F

C. less than 0.99 and less than or equal to 140°F

D. less than 0.99 and less than or equal to 200°F

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. CORRECT per Definitions in Technical Specifications Table 1.1.

B. Plausible because this is the correct keff and less than or equal to is 200°F is MODE 5.

Incorrect because Tavg is too high.

C. Plausible because this is shutdown and all that is needed for MODEs 5 and 6 and the temperature is correct.

Plausible because 200°F is a major MODE change where many Tech Specs become applicable on startup (well known hold point).

Incorrect because entry is into MODE 5 where the requirement is still < 0.99.

B. Plausible because 140°F is *one* of the criteria for MODE 6 (REFUELING)

Incorrect because the plant is still in MODE 5 below 140°F until the head bolts are detensioned

C. CORRECT per Tech Spec 3.9.1 LCO (in NOTES)

D. Plausible because the Action requirement for being <0.95 keff in MODE 6 is to immediately suspend CORE ALTERATIONS (see NOTES).

Incorrect because reduction of Keff to <0.95 cannot be delayed until the start of CORE ALTERATIONS (after the head bolts are detensioned and the head removed)

K/A: 2.2.35 Ability to determine Technical Specification Mode of Operation.

K/A Match: the K/A is met because the candidate must determine when the REFUELING MODE of operation is entered so as to determine when the associated k_{eff} is required by Tech Sped 3.91 ("above the line").

Selection criteria; no existing bank questions were tied to this K/A. New question written to precisely match K/A at a higher cognitive level.

Tier: 3
Importance Rating: RO 3.6
Technical Reference: Technical Specification Table 1.1

Proposed references to be provided to applicants during examination: None

Learning Objective: SB-4-02

10 CFR Part 55 Content: 41(b)5

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

75. 2.2.37 003/BANK/VCS CLOSED/KNOWLEDGE//RO/SUMMER/2/3/11/NO

Given the following plant conditions:

- 100% power
- Makeup to the 'A' SI Accumulator was just completed.
- 'A' SI Accumulator parameters are as follows:
  - Boron Concentration: 2207 ppm
  - Pressure: 672 psig

Which ONE (1) of the following describes whether the boron concentration and pressure are within the Technical Specification limits to establish OPERABILITY in accordance with TS3.5.1, "Accumulators"?

	Boron Concentration	Pressure
A.	Within limit	Within limit
B.	Outside limit	Within limit
C.✓	Within limit	Outside limit
D.	Outside limit	Outside limit

QUESTION USAGE:

RO 2011 NRC

QUESTION HISTORY:

Modified TECH APECS 368 MRB
OPS review RT
Approved RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is right.

Incorrect since pressure is above the 656 psig limit.

B. Plausible because the boron concentration is close to the 2200 ppm limit.

Incorrect since boron is just within limits and Pressure is just outside of the band.

C. CORRECT per TS 3.5.1.

D. Plausible because the secondpart is right and the boron concentration is close to the 2200 ppm limit.

Incorrect since boron is just within limits.

K/A: 2.2.37 Ability to determine operability and/or availability of safety related equipment.

K/A Match: the K/A is met because the candidate must evaluate the OPERABILITY of the RCS leak detection system when the normal indication (Integrate Plant Computer System) is not available.

Selection criteria; two existing bank questions were tied to this K/A. EFW SYSTEM 36 was more of a system question and relied on information "below the line", which made it more of a SRO OPERABILITY call. The selected question was more generic in character and relied on information in the LCO itself ("above the line"), making it more of a Tier 3 RO question.

Tier: 3
Importance Rating: RO 3.6
Technical Reference: OAP-106.1, Technical Specification
Proposed references to be provided to applicants during examination: None

Learning Objective: OAP-106.1-06

10 CFR Part 55 Content: 41(b)7

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments: TL guessed right, long time since performed in plant.Able to nuke out why distractors were wrong.
RW SRO to determine operable vs inoperable never looked at first half of question. Knew action because did in the plant.

You have completed the test!

1. 000059AA2.03 004/NEW//HIGHER//SRO/SUMMER/5/19/11/NO

Given the following plant conditions:

- Release of Waste Monitor Tank "A" is in progress
- RM-L5, LIQUID WASTE EFFLUENT LIQUID RADIATION MONITOR is **INOPERABLE**
- XCP-644, 2-5 LIQ WST DISCH RM-L9 HI RAD alarms at 0100
- RM-L9 setpoint is set at 4000 c/m per the Liquid Waste Release Permit
- RM-L9 indication is read at 1.0×10^6 c/m at the time of alarm
- PVD-6910 LIQUID EFFLUENTS TO FAIRFIELD PENSTOCKS **fails to close**
- At 0105 Maintenance reports that isolation of the release is likely but NOT certain

Which ONE (1) of the following identifies the Emergency Action Level classification that will be declared and the time at which will it will be declared if the release CANNOT be isolated?

REFERENCE PROVIDED

A. NUE at 0115

B.✓ ALERT at 0115

C. NUE at 0200

D. ALERT at 0200

DRAFT

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because the leak is not likely in the next hour and the setpoint is exceeded for an NUE. The second part is plausible because the alert must be declared after 15 minutes.

Incorrect because the counts are high enough to declare an Alert.

B. CORRECT. Current radiation levels are 1E6 and the Alert threshold is 200X the high rad alarm or 8E5 and the alert is declared after 15 minutes.

C. Plausible because the setpoint for an NUE is exceeded and this would be the correct time if the NUE was to be declared.

Incorrect because the setpoint for an Alert is also exceeded.

D. Plausible because the setpoint for an Alert is met and this is the time in which a NUE would be declared.

Incorrect because the declaration is when the setpoint is exceeded for >15 minutes.

K/A: 000059 Accidental Liquid Radwaste Release AA1.01 Ability to operate and/or monitor the following as they apply to the Accidental Liquid Radwaste Release: Radioactive-liquid monitor

Note: the original KA was 000059 AA2.03 but was rejected.

K/A Match: the K/A is met because the candidate must be able to monitor RM-L9, a radioactive-liquid monitor to make a emergency classification.

Selection criteria; New question written to match K/A.

Tier: 1 **Group:** 2
Importance Rating: SRO 3.5
Technical Reference: EPP-001 Attachment I
Proposed references to be provided to applicants during examination: EPP-001 Attachment I

Learning Objective: EPP-001-01

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question requires the determination of the correct emergency classification for a given set of conditions.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

2. W/E16G2.4.30 003/NEW//HIGHER//SRO/SUMMER/2/16/11/NO

Given the following plant conditions:

- Before the event, Reactor Building High Range Radiation Monitor Channels RM-G7 and RM-G18 were both reading <1R/hr
- A significant event raised the reading on RM-G7 to 1900 R/hr and RM-G18 to 2100 R/hr

Which ONE (1) of the following statements identifies the event classification that must be reported to the NRC and the status of fission product barriers?

REFERENCE PROVIDED

A. Site Area Emergency due to the loss of one barrier and the potential loss of one barrier

B. ✓ Site Area Emergency due to the loss of two barriers

C. General Emergency due to the loss of two barriers and the potential loss of another barrier

D. General Emergency due to the loss of three barriers

QUESTIONS REPORT
for 2011 NRC SRO
PROVIDE EPP-001 ATT. 1 (EAL classification matrix)

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by Matthew R. Bender as a new question.
Ops Review: RT
Approved:RJ

DISTRACTOR ANALYSIS:

A. Plausible because the classification is correct and the examinee could misread which setpoints are losses vs potential losses.

B. CORRECT. Both the fuel clad (>2E3) and reactor coolant system (>4E2) barriers are lost and the radiation level are below the level to call the potential loss of containment (>2E4 R/hr) and that corresponds to FS1.1.

C. Plausible because this would be true if the candidate misapplied the numbers on containment and determined that there was a potential loss of containment.

Incorrect because the values are less than 2E4.

D. Plausible because this would be true if the candidate miss applied the numbers and because the other two are under the loss column.

Incorrect because the values are less than 2E4 and containment only goes to a potential loss on high radiation.

K/A: W/E16 High Containment Radiation G2.4.30 Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.

K/A Match: The K/A is met becasue the candidate must decide what NRC notification of Emergency Action Level declaration should be made based on High Containment Radiation.

Selection criteria; No existing bank questions were tied to this K/A. No questions with "classify" and "event" in the stem or choices related to high rads in the RB.

Tier: 1 **Group:** 2
Importance Rating: SRO 4.1
Technical Reference: EPP-001 Att. 1 and EPP-108

Proposed references to be provided to applicants during examination: EPP-001 Att. 1 (EAL classification matrix)

Learning Objective: 4095 (SRO/SE)
10 CFR Part 55 Content: 43(b)4

SRO Justification: SRO Only because the question tests knowledge of Event classification, which is a SS/IED function.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

3. 2.2.25 003/NEW//LOWER//SRO/SUMMER/2/28/11/NO

Given the following plant conditions:

- Mode 1
- The surveillance requirement to determine CONTROLLED LEAKAGE has just been completed.

Which ONE(1) of the following correctly identifies the limit contained in Technical Specifications for CONTROLLED LEAKAGE and the basis?

A. Less than 33 gpm total to ensure that the charging pumps do not reach runout during a safety injection.

B.✓ Less than 33 gpm total to ensure that the analyzed Safety injection flow occurs via the cold leg injection lines.

C. Less than 13 gpm per pump to ensure that the charging pumps do not reach runout during a safety injection.

D. Less than 13 gpm per pump to ensure that the analyzed Safety injection flow occurs via the cold leg injection lines.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible, the flow limit is right and seal injection does add to the cold leg injection line flow.

Incorrect, SI flow balancing valves prevent runout even with the seal injection throttle valve (HCV-186) fully open.

B. CORRECT per TS 3.4.6.2.e and BASIS.

C. Plausible, this is the maximum seal injection flow permitted by SOP-101Precaution 2.a.5)on pg 4 of 144 and seal injection does add to the cold leg injection line flow.

Incorrect, this is not a TS limit and applying 3 times 13 gpm/pump = 39 gpm, which would violate TS. Also SI flow balancing valves prevent runout even with the seal injection throttle valve (HCV-186) fully open.

D. Plausible, this is the maximum seal injection flow permitted by SOP-101Precaution 2.a.5)on pg 4 of 144 and seal injection does add to the cold leg injection line flow and the Basis is correct.

Incorrect, this is not a TS limit and applying 3 times 13 gpm/pump = 39 gpm, which would violate TS.

K/A: Equipment Control 2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.

K/A Match: the K/A is met because the candidate must know the basis for TS 3.7.2.

Selection criteria: New

Tier: 3
Importance Rating: SRO 4.2
Technical Reference: TS 3.7.2 and BASIS

Proposed references to be provided to applicants during examination: None

Learning Objective: SB-4-15

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because the question tests knowledge of TS bases that is not a safety limit.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

4. 000062AA2.03 002/NEW//HIGHER//SRO/SUMMER/2/16/11/NO

Given the following plant conditions:

Time 0100

- A Safety Injection has occurred
- The "A" EDG failed to start

Time 0105

- Loss of 115 kV offsite power occurred

Time 0110

- Operators are taking action in accordance with SOP-117 SERVICE WATER SYSTEM.
- Maintenance reports that A EDG can be started in FIVE (5) minutes

Which ONE(1) of the following describes the operation of XVB-3107A, RBCU 64A/65A RTN TO SW PND, **prior to** starting a Service Water Booster pump to restore RBCU cooling and the reason?

A. Open XVB-3107A to prevent operation of the Service Water Booster pump at shutoff head

B. Open XVB -3107A to remove air voids from RBCU cooling lines

C. Close XVB-3107A to prevent Service Water Booster Pump runout

D✓ Close XVB-3107A to prevent water hammer

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because the centrifugal SW booster pumps do not have a miniflow line and will be dead headed until the 3106 (pump discharge) and 3107 (RB outlet) valves are open.

Incorrect because the Tech Spec basis is not shutoff head.

B. Plausible because air binding of the RBCUs would reduce heat transfer from the RB atmosphere to the SW system, and flushing high point vents with flow is a frequent evolution (i.e. jogging RCP to clear SG U-tubes).

Incorrect because opening the RB discharge (3107) valves prior to starting the SWBPs would drain the RBCUs, setting up the water hazard event discussed in 3/4.6.3 TS BASIS. Also, the fast closure of the 3107 valves on SWBP trip is designed to *prevent* this condition.

C. Plausible because filling a voided system could produce high flow .

Incorrect because the runout period would be too brief to cause pump or motor damage (flow to the non-selected (idle) Reactor Building Cooling Unit is isolated by auto-closure of the idle RBCU's discharge valve).

D. CORRECT per Infrequent Operation section IV.M of System Operating Procedure SOP-117, EOP-1.0 Att. 3 step 7.b RNO, and Tech Spec basis 3/4.6.2.3.

K/A: 000062 Loss of Nuclear Service Water AA2.03 Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition

K/A Match: K/A is matched because the candidate must know how to align the valves in order to start the Service Water Booster pumps. This bypasses the problem of air in the service water line and a potential water hammer event by slowly filling the line.

Selection criteria; No existing bank questions were tied to this K/A. Of the questions tied to APE062, SERVICE WATER SYSTEM 45 and 46 , AK3.02 were closest but discussed the Tech Spec basis from the "knowledge of interlocks" basis.

Tier: 1 **Group:** 1
Importance Rating: SRO 2.9
Technical Reference: EOP-1.0 Step 7 RNO, SOP-117 section IV.M, Tech Spec basis 3/4.6.2.3

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-1.0-08

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of Technical Specification bases and in depth knowledge of actions in EOP (Response Not Obtained for loss of one train of SW to containment and failure of a SW valve to autoclose)

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

5. 000025AA2.04 004/NEW//HIGHER//SRO/SUMMER/5/17/11/NO

Given the following plant conditions:

Time 0400
- Mode 4
- RCS Temperature is 235°F
- Pressurizer level is lowering uncontrollably.
- The crew has implemented AOP-112.1, SHUTDOWN LOCA due to indication of a loss of RCS inventory

Time 0410
- A and B charging pumps are running in injection mode
- Operators have isolated "A" RHR train to isolate the leak
- RCS WR Pressure is 440 psig and rising

Which ONE (1) of the answers below correctly answers the following:

1) How has the RHR train isolation affected the capability of the RHR pump suction relief valves to adequately relieve pressure?

2) How are operators directed to control RCS pressure increases in AOP-112.1?

A. The remaining RHR relief in service is capable of relieving the current mass addition; However, operators will open PORVs as necessary to maintain pressure below 325 psig.

B. The remaining RHR relief in service is capable of relieving the current mass addition; However, operators will open PORVs as necessary to maintain pressure below 450 psig.

C. The RHR relief in service is **NOT** capable of relieving the current mass addition; Operators will open PORVs as necessary to maintain pressure below 325 psig.

D✓ The RHR relief in service is **NOT** capable of relieving the current mass addition; Operators will open PORVs as necessary to maintain pressure below 450 psig.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible, RHR suction reliefs are the normal Cold Overpressure Protection for MODE 4 and the AOP attempts to maintain pressure above 325 psig by starting RHR pumps in the injection mode (CAUTION before step 23).

Incorrect, per the basis for TS 3.4.9.3, a single RHR suction relief valve can only limit the mass addition pressure transient from a single SI/Charging pump. Also, the Caution before step 11 and step 13 RNO operate PORVs at 450 psig, not 325 psig.

B. Plausible, RHR suction reliefs are the normal Cold Overpressure Protection for MODE 4 and the second part is correct.

Incorrect, per the basis for TS 3.4.9.3, a single RHR suction relief valve can only limit the mass addition pressure transient from a single SI/Charging pump.

C. Plausible, the first part is correct and the AOP attempts to maintain pressure above 325 psig by starting RHR pumps in the injection mode (CAUTION before step 23).

Incorrect, the Caution before step 11 and step 13 RNO operate PORVs at 450 psig, not 325 psig.

D. CORRECT per TS 3.4.9.3 Basis and the Caution before step 11 and step 13 RNO.

K/A: 000025 Loss of RHR System AA2.04 Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Location and isolability of leaks.

K/A Match: the K/A is met because the candidate must interpret the location of an RHR leak and interpret which RHR loops will become unavailable and interpret that the leak is isolable requiring that SI flow be immediately reduced to prevent repressurization.

Selection criteria; no existing bank questions were tied to this K/A. One bank questions, TECH SPECS 8, addressed active and passive failure but did not specify the RHR system. New question written to precisely match.

Tier: 1 **Group:** 1
Importance Rating: SRO 3.6
Technical Reference: AOP-112.1, SHUTDOWN LOCA, ARG-2, T.S. 3.4.9.3
Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-112.1-05

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests in depth knowledge of T.S and plant design basis and specific knowledge of AOP procedure steps read by SRO.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

6. 086A2.01 001/NEW//HIGHER//SRO/SUMMER/2/24/11/NO

Given the following plant conditions:

- The diesel fire pump started inadvertently.
- The pump has been shutdown but **not** reset (switch was left in OFF).
- The diesel fire pump pressure switch has been found failed to the low pressure condition.

Which ONE (1) of the following statements identifies the OPERABILITY of the diesel fire pump per FPP-024, FIRE SUPPRESSION, and the required action?

A. OPERABLE, provide a roving fire watch to start the pump when required.

B. OPERABLE, provide a continuous fire watch to start the pump when required.

C. INOPERABLE, establish a backup fire water system within 24 hours.

D.✓ INOPERABLE, restore to OPERABLE status within 7 days.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

New for 2011. (wdb 2/26/11)

Rev. 1 (wdb 3/28/11) removed AUTO/MAN from second bullet. Clarified condition of pressure switch in the last bullet.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because this is a mitigating action for loss of some Simplex (fire detection) panels per FPP-023 FIRE DETECTION 1.d.

Incorrect because FPP-024 does not contain this action.

B. Plausible because this is a mitigating action for loss of all Simplex (fire detection) panels per FPP-023 FIRE DETECTION 1.c.

Incorrect because FPP-024 does not contain this action.

C. Plausible because the first part is right and this is the required action for the fire suppression water system "otherwise inoperable" per FPP-024 FIRE SUPRESSION 2.

Incorrect because this is the action for problems *other than pumps.*

D. CORRECT per FPP-024 FIRE SUPRESSION 1. Diesel Fire Pump is INOPERABLE because it cannot perform its design function (start automatically if Fire Header pressure cannot be maintained by the electric fire pump).

K/A: 086 Fire Protection S: A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the Fire Protection System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Manual shutdown of the FPS

K/A Match: the K/A is met because the candidate must evaluate the OPERABILITY of the diesel fire pump after it is shutdown and use the appropriate Fire Protection Procedure to mitigate the consequences of the malfunction (pressure switch failure).

Selection criteria; Only one existing bank question, FPS 53, was tied to this K/A; it was an RO-level "how does the system work?). New question written to match K/A.

Tier: 2 **Group:** 2
Importance Rating: SRO 3.1
Technical Reference: FPP-024, Enclosure 6.1.1 and table 6.1.1.

Proposed references to be provided to applicants during examination: None

Learning Objective: GS-11-18

10 CFR Part 55 Content: 43(b)

SRO Justification: SRO Only because the question requires OPERABILITY determination and tests knowledge of FPER actions (relocated from Tech Spec 3/4.7.9 and 3/47.10 by amendment 79).

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

7. 2.2.38 002/BANK/VCS CLOSED/HIGHER//SRO/SUMMER/2/28/11/YES

Given the following plant conditions:

- 100% power for the last six months
- An audit of records determines that a required surveillance test has not been conducted in the last 6 months.
- The test is required to be performed quarterly.
- Risk management assessments conclude that risk associated with a delay of the surveillance is minimal.

Which ONE (1) of the following statements describes the latest time by which the surveillance must be completed in accordance with T.S. 4.0.3?

A. Within the next 24 hours

B. Within the next 23 days

C.✓ Within the next 92 days

D. Within the next 115 days

QUESTION USAGE:

2011 NRC SRO
SRO-10-01 WEEK 2

QUESTION HISTORY:

TECH SPECS 154
Rev. 0. Submitted by Matthew R. Bender as a new question.
Ops Review: 3/5/2010 FL
Approved: 3/25/2010 WRQ
Question was modified from a question used at Seabrook.

DISTRACTOR ANALYSIS:

A. Plausible because this would be the time if the table was misread as shiftly and 4.0.3 required the shorter of the surveillance interval or 24 hours.

Incorrect because it must be done within the next quarter.

B. Plausible because this would be true if the statement had you do the shorter of 24 hours or the surveillance requirement.

Incorrect because it must be done within the next quarter.

C. Correct. "If it is discovered that a Surveillance was not performed within its specified frequency, as defined by Specification 4.0.2, then compliance with the requirement to declare-The LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified frequency, whichever is greater. This delay period is permitted to allow performance of the surveillance. A risk evaluation shall be performed for any Surveillance delayed greater than 24 hours and the risk impact shall be managed."

D. Plausible because this would be applying the 25% extension of 4.0.2.

Incorrect because it must be done within the next quarter.

K/A: Equipment Control 2.2.38 Knowledge of conditions and limitations in the facility license.

K/A Match: Meets K/A by requiring knowledge of Technical Specifications which is appendix A of the license.

Selection criteria;
Selected as replacement after validation. Was chosen from the bank as SRO and did not overlap other questions on the NRC, Audit and Audit Retake.

Tier: 3
Importance Rating: SRO 4.5
Technical References: Technical Specifications

Proposed references to be provided to applicants during examination: None.

Learning Objective: SB-4-23

10 CFR Part 55 Content: 43(b)1

SRO Justification: SRO Only because the question tests application of 4.0.3.

8. 072A2.03 004/NEW//KNOWLEDGE//SRO/SUMMER/2/24/11/NO

Which Radiation Monitor is provided to allow determination of whether an event has occurred inside containment in accordance with the basis for Technical Specification 3.3.3.6, ACCIDENT MONITORING INSTRUMENTATION and the **INITIAL** action required if the power supply were to fail on this monitor?

A. RM-G18, REACTOR BUILDING AREA RADIATION MONITOR
Submit a Special Report within 14 days.

B.✓ RM-G18, REACTOR BUILDING AREA RADIATION MONITOR
Restore within operable status within 30 days.

C. RM-A4, REACTOR BUILDING PURGE EXHAUST AIR MONITOR
Submit a Special Report within 14 days.

D. RM-A4, REACTOR BUILDING PURGE EXHAUST AIR MONITOR
Restore within operable status within 30 days.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by MRB as a new question
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because the monitor is correct and a written report is required within after an additional 14 days if it is not restored within 30 days.

Incorrect because the report does not have to be written until 30 days have passed and the monitor is still inoperable.

B. CORRECT. RM-G18 is required for post accident monitoring and the action is to restore to operable status within 30 days.

C. Plausible because the monitor is responsible for providing containment closure on high radiation and the action is required after the initial 30 days if the monitor is still out of service.

Incorrect because the monitor is not covered by this specific technical specification and the action is wrong.

D. Plausible because the monitor is responsible for providing containment closure on high radiation and the second part is correct.

Incorrect because the monitor is not covered by this specific technical specification.

K/A: 072 Area Radiation Monitoring A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the ARM system- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Blown power-supply fuses

K/A Match: the K/A is met because the candidate must use the Technical Specification actions to mitigate the malfunction if a power supply fuse blew and caused power to be lost to the monitor.

Selection criteria; No existing bank questions were tied to this K/A. New question written to match K/A.

Tier: 2 **Group:** 2
Importance Rating: SRO 2.9
Technical Reference: Technical Specification 3.3.3.6

Proposed references to be provided to applicants during examination: None

Learning Objective: SB-4-19

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because the question tests knowledge of TS action requirements (below the line) greater than 1 hour.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

9. 000007EG2.4.34 003/NEW//HIGHER//SRO/SUMMER//NO

Given the following plant conditions:

- Power 100%
- The Main Control Room has been evacuated due to toxic gas
- Controls have been transferred to the Control Room Evacuation Panel (CREP) in accordance with AOP-600.01
- The CRS starts the "B" Service Water pump at 0000

Which ONE (1) of the following statements correctly identifies the following:

1) The OPERABILITY status of the "B" Service Water Pump after controls are transferred to the CREP

2) The latest time by which ventilation in the Service Water pump house must be verified running

A. OPERABLE
By 0030

B. OPERABLE
By 0042

C.✓ INOPERABLE
By 0030

D. INOPERABLE
By 0042

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by MRB as a new question.
OPS Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because the service water pump can be started and transferring it to the CREP does not affect its ability to cool plant loads. The second part is plausible because it is correct.

Incorrect because the pump loses its autostart functionality from the CREP and so is INOPERABLE.

B. Plausible because the service water pump can be started and stopped and transferring it to the CREP does not affect its ability to cool plant loads. The second part is plausible because this is the time in FEP-4.0, CONTROL ROOM EVACUATION DUE TO FIRE, that the crew must start the HVAC units by.

Incorrect because the pump loses its autostart functionality from the CREP and so is INOPERABLE and the ventilation must be verified within 30 minutes.

C. CORRECT. The pump is INOPERABLE because the pump loses its autostart functionality from the CREP and the second part is correct Per AOP-600.1, CONTROL ROOM EVACUATION, Attachment 4.

D. Plausible because the first part is right and The second part is plausible because this is the time in FEP-4.0, CONTROL ROOM EVACUATION DUE TO FIRE, that the crew must start the HVAC units by.

Incorrect because the time is 0030 per AOP-600.1, CONTROL ROOM EVACUATION, Attachment 4.

K/A: 000007 Reactor Trip-Stabilization-Recovery EG2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.

K/A Match: the K/A is met because the candidate must evaluate the RO actions required during an emergency requiring Control Room Evacuation compounded by an unexpected trip of a Reactor Coolant Pump

Selection criteria; The only SRO question tied to this K/A was already on the 2011 audit. There are few EOP actions for ROs outside the control room so all of the EPPS/FEPS questions were sorted for SRO applicability; however, none contained RO actions. Of the 29 questions with AOP-600.1 referenced, the selected question was best tied to reasons for selection of specific actions from an RNO (SRO knowledge).

Tier: 1 **Group:** 1
Importance Rating: SRO 4.1
Technical Reference: AOP-600.1 CONTROL ROOM EVACUATION

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-600.1-07

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question requires in depth knowledge of a specific step and a determination of OPERABILITY.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

10. 063A2.02 003/NEW//HIGHER//SRO/SUMMER/2/23/11/NO

Given the following plant conditions:

- An equalizing charge of "A" Battery XBA1A is in progress.
- XFN0038A, BATT&CHG RM AIR HANDLING UNIT A SUP FAN is found tripped.
- Battery 1A room temperature is 15°F greater than the maximum zone temperature contained in Technical specification 3.7.9, Area Temperature Monitoring
- It is determined that temperature exceeded the maximum zone temperature 45 minutes ago.

Which ONE (1) of the following statements correctly identifies the operability of 1A Battery and an additional impact of the loss of ventilation?

A.✓ 1A Battery is operable.
Hydrogen may build up to explosive concentrations.

B. 1A Battery is operable.
Sulphuric acid vapors may build to a hazardous concentration.

C. 1A Battery is <u>NOT</u> operable.
Hydrogen may build up to explosive concentrations.

D. 1A Battery is <u>NOT</u> operable.
Sulphuric acid vapors may build to a hazardous concentration

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
Ops Rev: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. CORRECT because temperature has not been 30°F above the limit for 4 hours per TS action 3.7.9 and the TSR lists hydrogen acccumulation as the concern.

B Plausible because the first part is right and the battery does contain sulphuric acid.

Incorrect because the TSR lists hydrogen acccumulation as the concern.

C. Plausible because the battery is environmentally qualified to only 90°F so 88° + 15°= 103°F for zones 10 and 11 is outside the qualified range per TSR 1020 pg. 3/4 7-38e and the TSR basis lists hydrogen accumulation as the basis.

Incorrect because temperature has not been 30°F above the limit for 4 hours per TS action 3.7.9.

D. Plausible because the first part is right and the battery does contain sulphuric acid.

Incorrect because temperature has not been 30°F above the limit for 4 hours per TS action 3.7.9. and the TSR basis lists hydrogen accumulation as the basis.

K/A: 063 DC Electrical Distribution A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of ventilation during battery charging

K/A Match: The K/A is met because the candidate must know how to recover from a loss of ventilation during a battery charge and predict the impact of the loss as well.

Selection criteria; no existing bank questions were tied to this K/A. The only question whose stem contains "battery" and "ventilation" was PLANT VENT SYSTEM 20, which is a simple "what is the purpose", negative, and not at A2 level. PLANT VENT SYSTEM 4 was a simple "what is the temperature limit in the battery room" question.New question written to match K/A.

Tier: 2 **Group:** 1
Importance Rating: SRO 3.1
Technical Reference: Tech Specs
Proposed references to be provided to applicants during examination: None

Learning Objective: GS-3.20.3

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question requires the candidate to determine the operability of the battery and to know the bases of technical specifications that is not a safety limit.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

11. 012A2.01 004/NEW//KNOWLEDGE//SRO/SUMMER/2/18/11/NO

Given the following plant conditions:

- 100% power
- Overpower ΔT channel I was declared inoperable 2 hours ago due to a an inoperable bistable
- Overpower ΔT channel II is now declared inoperable due to discovery of a similar bistable problem
- I&C cannot determine when either channel can be repaired

Which ONE (1) of the following statements identifies the required action in accordance with Technical Specifications?

A.✓ Begin reducing power within one hour.

B. Begin reducing power immediately.

C. Either channel I or II must be restored within 72 hours; If not, power reduction must begin within the next hour

D. Either channel I or II must be restored within 72 hours. If not, power reduction must begin immediately

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. CORRECT. With two of the three channels inoperable the Technical Specification 3.0.3 must be entered which states that within ONE (1) hour action must be taken to place the plant in a mode where the specification does not apply.

B. Plausible becuase it is a common misunderstanding that the plant must immediately start reducing the mode upon entry into 3.0.3.

C. Plausible because the action statement for loss of a channel is to trip the bistable within 72 hours. Since both bistables cannot be tripped at 100% power without cause a reactor trip the candidate may incorrectly think that not following the action statement requires entry into 3.0.3 which would then allow another hour to start decreasing power.

   Incorrect because with 2 channels out 3.0.3 is immediately entered and not after the action statement cannot be complied with.

D. Plausible because the action statement allows 72 hours to trip the bistable and the candidate may incorrectly think to apply the action statement and then when the action statement cannot be complied with then misapplying 3.0.3 by thinking that the plant must be moved immediately.

   Incorrect because 3.0.3 must immediately be applied and so the plant must start to reduce power within one hour.

K/A: 012 Reactor Protection A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Faulty bistable operation

K/A Match: the K/A is met because the candidate must predict the impact of the failed bistables (cannot trip both of them without tripping the plant) and use the Technical Specifications to mitigate the consequences of the lost bistables.

Selection criteria; New question written to match K/A.

Tier: 2 **Group:** 1
Importance Rating: SRO 3.6
Technical Reference: Technical Specification Table 3.3-1 and TS 3.0.3

Proposed references to be provided to applicants during examination: None

Learning Objective: SB-4-17

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because the question tests knowledge of TS 3.0.3 and application of an action statement > 1 hour.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

12. 039G2.4.11 002/NEW//HIGHER//SRO/SUMMER/2/21/11/NO

Given the following plant conditions:

- 100% power
- The breaker for the "A" Motor Driven Emergency Feedwater pump is racked down for maintenance
- Main Steam supply valves XVG-2802A and XVG-2802B to the Turbine Driven Emergency Feedwater pump are subsequently declared inoperable due to a common-mode failure

Which ONE (1) of the following statements identifies an action or actions required by Technical Specifications for this condition?

A. Restore Either "A" Motor-driven or the Turbine-Driven Emergency Feedwater pump to operable status within 72 hours or be in Hot Standby within the next 6 hours.

B.✓ Be in at least Hot Standby within the next 6 hours and Hot Shutdown within the following 6 hours.

C. Within ONE (1) hour make preparations to reduce power and then be in at least Hot Standby within the next 6 hours.

D. Do <u>NOT</u> reduce power but Immediately initiate corrective action to restore one Emergency Feedwater Pump to operable status as soon as possible.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by MRB as a new question.
Ops Review: RJ
Approved: RT

DISTRACTOR ANALYSIS:

A. Plausible because this is the action of TS 3.7.1.2 for *one* EFW pump INOPERABLE.

Incorrect because two pumps are INOPERABLE.

B. CORRECT per TS 3.7.1.2.b for two EFW pumps INOPERABLE.

C. Plausible because this is the generic 3.0.3 requirement which would apply for two pumps in most system INOPERABLE (i.e. 2 RB Spray pumps per TS 3.0.3 BASIS).

Incorrect because the EFW system has 3 pumps and TS 3.7.1.2.b specifically covers this circumstance.

D. Plausible because this is the required action of 3.7.1.2.c for *all three* EFW pumps INOPERABLE.

Incorrect because the B MDEFW pump should be assumed OPERABLE (not otherwise indicated in the stem).

K/A: 039 Main and Reheat Steam G2.4.11 Knowledge of abnormal condition procedures.

K/A Match: the K/A is met because the candidate must know the action to take if the valves of the main steam system that supply steam to the TDEFW pump are inoperable.

Selection criteria; No existing bank questions were tied to this K/A. One existing bank questions for G2.4.11, EOPS 206, concerned EOP bases and should be G2.4.18. EOPS564 is an SRO 039A2 but more of an EOP basis. There are no AOPs for Main or Reheat Steam. New question written based on Annunciator Response Procedure, this was the only ARP giving Tech Spec actions to permit use as an SRO-only question.

Tier: 2 **Group:** 1
Importance Rating: SRO 4.2
Technical Reference: Tech Specs.

Proposed references to be provided to applicants during examination: None

Learning Objective: SB-04-19

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because the question tests knowledge of Technical Specification actions greater than 1 hour (below the line).

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

Comments:

13. 076A2.01 004/NEW//HIGHER//SRO/SUMMER/2/22/11/NO

Given the following plant conditions:

- 100% power
- CCW Loop "A" is the Active Loop.

- "A" SW pump tripped on overcurrent
  - Control switch is in pull to lock
  - Breaker is racked up

- "C" SW Pump is being aligned to the A train
  - Control switch is in normal after stop
  - Breaker is racked up

Select ONE (1) of the answers below that identifies the following:

a) An component in another system that became inoperable due to the "A" Service Water pump failure.

b) The OPERABILITY status of the "A" Service Water train due to the current breaker positions

A. The "A" Motor-Driven Emergency Feedwater Pump

"A" SW Train is OPERABLE

B✓ The "A" Motor-Driven Emergency Feedwater Pump

"A" SW Train is INOPERABLE

C. The "A" Emergency Diesel

"A" SW Train is INOPERABLE

D. The "A" Emergency Diesel

"A" SW Train is OPERABLE

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because the first part is correct and the second part is plausible because an operable pump is racked up on the "A" train.

B. CORRECT. TSR 1026 states that an EFW pump is inoperable if it has NO source of operable Service Water and the "A" train is inoperable because in the current configuration the "C" SW pump will not start on a safety injection signal without either being already running or if the "A" pump was racked down.

C. Plausible because the Emergency Diesel is cooled by service water and the second part is correct.

   Incorrect because technical specifications do not cascade, except for in a few number of cases.

D. Plausible because the Emergency Diesel is cooled by service water and an operable SW pump is now racked up.

   Incorrect because technical specifications do not cascade, except for in a few number of cases and the "C" SW pump will not start on a safety injection signal without either being already running or if the "A" pump was racked down.

K/A: 076 Service Water A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS

K/A Match: the K/A is met because the candidate must know how to use technical specifications to mitigate the loss of the SWS.

Selection criteria; This was the only existing bank question tied to this K/A.

Tier: 2 **Group:** 1
Importance Rating: SRO 3.7
Technical Reference: Technical Specifications 3.7.1.2 and 3.7.4 and AOP-117.1 and SOP-118
Proposed references to be provided to applicants during examination: None

Learning Objective: IB-01-20

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because the question requires determination of operability of both another system based on the service water system and the service water system itself in a particular alignment.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

14. 000027AA2.01 003/NEW//HIGHER//SRO/SUMMER/5/18/11/NO

Given the following plant conditions:

- PI-444, CNTRL CHAN PRESS PSIG, has failed high
- Operators were not able to close any PORV OR PORV block valve
- Reactor Trip AND Safety Injection have actuated
- RCS Subcooling is 20°F and rising slowly
- RCS Wide Range Pressure is 960 psig and stable
- All steam generator levels at 30% and rising
- RB pressure is 2 psig and rising
- Operators are taking action in accordance with EOP-2.0, Loss of Reactor or Secondary Coolant
- A step that checks SI termination criteria is in progress

Which ONE (1) of the following correctly identifies whether Pressurizer level GREATER than the SI termination criterion is expected for this event and whether other conditions are met to transfer to EOP-1.2, SI Termination?

A✓ Pressurizer level will be met but subcooling is too low, operators will remain in EOP-2.0 during this step.

B. Pressurizer level will be met and all other conditions are met to terminate SI. Operators will transition to EOP-1.2.

C. Pressurizer level will NOT be met and subcooling is too low to terminate SI. Operators will remain in EOP-2.0 during this step.

D. Pressurizer level will NOT be met and steam generator levels are too low to terminate SI. Operators will remain in EOP-2.0 during this step.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 submitted as a new question for 2011 NRC exam
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. CORRECT. The PZR steam space LOCA will result in head voiding and high PZR level, but subcooling is below the 52.5°F requirement of step 10.a, so the RNO will bypass the transition to EOP-1.2 (WOG ES-1.1).

B. Plausible, the first part is right and SG level and RCS pressure meet the requirements of step 10.b and 10.c.

Incorrect, subcooling requirement of step 10.a is not met.

C. Plausible, the second part is right (subcooling is too low).

Incorrect. PZR level will rise rapidly when the Reactor Vessel head voids due to the PZR steam space LOCA.

D. Plausible, SG levels *would* be to low *if* containment conditions were adverse.

Incorrect. PZR level will rise rapidly when the Reactor Vessel head voids due to the PZR steam space LOCA and RB pressure is less then 3.6#, so containment is Normal and only 26% is required by step 10.b.

K/A: 000027 PZR Pressure Control System Malfunction AA2.01 Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Conditions which will cause an increase in PZR level.

K/A Match: the KA is matched because it requires the ability to determine that a failed open PORV will cause Pressurizer level to offscale high and cause spray to be ineffective for pressure control.

Selection criteria; New question written to match K/A at SRO level.

Tier: 1 **Group:** 1
Importance Rating: SRO 3.8
Technical Reference: EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION, EOP-1.2, SAFETY INJECTION TERMINATION

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-2.1-02,04

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of procedure selection and that is not a major EOP

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

15. 000056EA2.06 004/NEW//HIGHER//SRO/SUMMER//NO

Given the following plant conditions:

- All offsite power (115 KV and 230 KV) was lost
- Neither EDG started
- The crew is implementing EOP-6.0, LOSS OF ALL ESF AC POWER
- Power was restored after ONE (1) hour
- The crew is at Step 33 to "select the appropriate recovery procedure"

Based on the provided Integrated Plant Computer System screen, which ONE (1) of the following describes the transition required?

REFERENCE PROVIDED

A. EOP-6.2, LOSS OF ALL ESF AC POWER RECOVERY WITH SI REQUIRED, due to inadequate subcooling.

B. EOP-6.2, LOSS OF ALL ESF AC POWER RECOVERY WITH SI REQUIRED, due to inadequate Pressurizer level.

C. EOP-6.2, LOSS OF ALL ESF AC POWER RECOVERY WITH SI REQUIRED, due to safety injection flow.

D✓ EOP-6.1, LOSS OF ALL ESF AC POWER RECOVERY WITHOUT SI REQUIRED, due to safety injection not being required.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

New Submitted by WDB 7/14/2011
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

(Run simulator w/ Mal EPS-1, perform actions of EOP-6.0, override point IDs as needed)
U6024, Subcooling=54°F, PZR level=18%, SI_{net}=0.0, CNTMT RAD = False

A. Plausible, subcooling is too low for adverse containment values which is at 67.5°F.

Incorrect because this value of subcooling is above 52.5°F which is all that is needed for normal conditions.

B. Plausible because Pressurizer level is not enough for adverse containment (28%).

Incorrect because in normal containment there is enough level (greater than 10%).

C. Plausible because safety injection could have occured due to RCP seal failure or SG PORV operation (steamline pressure rate compensated and plant is on natural circulation)

Incorrect because screen shows no SI flow.

D. CORRECT. Subcooling is above 52.5°F, PZR level is above 10%, and SI net flow is indicated and containment is normal.

K/A: 000056 Loss of Offsite Power S; G2.1.19 Ability to use plant computers to evaluate system or component status.

K/A Match: The K/A is met because the candidate must select a procedure based on plant status using a print out from the IPCS computer.

Selection criteria; Only three existing SRO/STA bank questions were tied to the generic part of this K/A. ADMIN PROCEDURE 442 covered tech Spec operability calls with the IPCS unavailable, but the distracters only applied at power (not after a trip due to LOOP). PLANT COMPUTER 9 discussed how to determine MWD/MTU; this would be used for Shutdown Margin determination after a trip but is a weak match to "system or component status". The selected question was the best fit to the last part of the K/A. The 7 RO questions were knowledge of how to interpret the displays, which is control board operator knowledge.

Tier: 1 **Group:** 1
Importance Rating: SRO 3.8
Technical References: EOP-6.0 (ECA-0.0)

Proposed references to be provided to applicants during examination: Printout from IPCS

Learning Objective: EOP-6.0-09

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because requires assessing plant conditions and selecting a procedure that is NOT a Major EOP

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

16,103G2.4.18 002

Given the following plant conditions:

- A Large Break Loss of Coolant Accident has occurred.
- Neither RHR pump is available.
- The crew is implementing EOP-2.4 LOSS OF EMERGENCY COOLANT RECIRCULATION.
- RB pressure is 40 psig and rising slowly
- RWST level is 30% and lowering
- Both spray pumps are taking suction from the RWST
- No RBCU's are running.
- Operators are performing a step to determine Reactor Building Spray Pump requirements

Which choice below correctly answers both of the following:

a) Should any Reactor Building Spray pump be stopped?

b) Why does the procedure require closing MVG-3003A(B), SPRAY HDR ISOL LOOP A(B) IF an RB Spray Pump is secured?

A.✓ No, ALL Reactor Building Spray pumps should remain running

Ensure containment isolation.

B. YES, ONE (1) RB spray pump should be secured

Ensure containment isolation.

C. No, ALL Reactor Building Spray pumps should remain running

Prevent gravity drain of the RWST into containment.

D. YES, ONE (1) RB spray pump should be secured

Prevent gravity drain of the RWST into containment.

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

New for 2011 (wdb 2/23/11)

Rev. 1 Made 2X2 because C and D were not plausible.

Rev. 2 Submitted by RJ
Split question out and bolded underlined if.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. CORRECT. With >18% RWST level then no RB spray pump should be secured. The second part is right per basis for EOP-2.4 (WOG ECA-1.1 step 6, in NOTES). Answer is not obvious due to RB Spray being semi-closed outside of Containment; release path is through RB Spray piping back to the Refueling Water Storage Tank (RWST) then out RWST vent to the Aux Building Charcoal Exhaust (drawings 302-651 and 912-125 C1).

B. Plausible because this would be the case if any RWST level was between 10% and 18% and the second part is correct.

Incorrect because in this case both the spray pumps should remain running.

C. Plausible because the first part is correct and because the normal level in the RWST is above the highest expected level in the RHR sumps (419.5' elevation) and the RWST has been drained into the sump through the RHR system at VCS (during an outage).

Incorrect because height of the RB spray headers (top of the RB) is above the maximum level in the RWST.

D. Plausible because if any RBCU was running the first part would be correct and the normal level in the RWST is above the highest expected level in the RHR sumps (419.5' elevation) and the RWST has been drained into the sump through the RHR system.

Incorrect because both spray pumps should remain running without any RBCU's and the height of the RB spray headers is above the maximum level in the RWST.

K/A: 103 Containment G2.4.18 Knowledge of the specific bases for EOPs.

K/A Match: the K/A is met because the candidate must know the basis for a specific step in the EOPs.

Selection criteria; No existing bank questions were tied to the whole K/A. EOPS 207 was tied to the generic part of the K/A but was more related to RCP motor cooling than to Containment in general.

Tier: 2 **Group:** 1
Importance Rating: SRO 4.0
Technical Reference: EOP-2.4 (WOG ECA-1.1) basis

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-2.4-05

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of detailed basis of a step in an Emergency Contingency Action as well as the action.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

17. W/E08G2.4.21 002/NEW//HIGHER//SRO/SUMMER/2/18/11/NO

A Main Steamline Break occurred in the Reactor Building 30 minutes ago

- All MSIVs have failed to close
- The crew is implementing EOP-3.1 UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS

The following plant parameters are noted:

- SG NR levels are; "A" 27% "B" 21%, "C" 22%
- SG EFW flows are; "A" 50gpm "B" 50gpm, "C" 50gpm
- RCS T_{cold}s are; "A" 195°F "B" 185°F, "C" 183°F
- RCS Wide Range PT-402 and 403 read 40 psig
- Pressurizer level is 0%
- RHR flows are; "A" train 0 gpm, "B" train 3000 gpm
- RB pressure is 40 psig
- RB sprays are; "A" train 0 gpm, "B" train 2600 gpm

Which ONE (1) of the following statements identifies the procedure the CRS will use to mitigate this condition?

The CRS will:

REFERENCE PROVIDED

A. Transition to EOP-15.0, RESPONSE TO LOSS OF SECONDARY HEAT SINK

B. Transition to EOP-16.0, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK

C✓ Transition to EOP-17.0, RESPONSE TO HIGH REACTOR BUILDING PRESSURE

D. Transition to EOP-18.1, RESPONSE TO LOW PRESSURIZER LEVEL

PROVIDE EOP-12.0 Att. 4, PLANT OPERATIONAL LIMITS CURVE

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

New for 2011 (wdb 2/16/11)

Rev. 1 RJ

Rev. 2 Submitted based on 2nd validation.
Changed RB spray flow for B train from 1900 gpm to 0 gpm.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because a red path to EOP-15.0, RESPONSE TO LOSS OF SECONDARY HEAT SINK, is present.

Incorrect because EOP-3.1 had operators reduce EFW. EOP-15.0 states that if it is entered based on operator action that it can be exited, so it will not be effective in this condition.

B. Plausible because a significant cooldown has occured and temperature and pressure are to the right to of limit A.

Incorrect because RHR flow is indicated above 1100 and so no entry into EOP-16.0, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK is required.

C. CORRECT. Because RB pressure is 40 psig and only one spray pump has flow greater than 2500 gpm so in accordance with EOP-12.0 (F-0), MONITORING OF CRITICAL SAFETY FUNCTIONS, a yellow path exists for EOP-17.0, RESPONSE TO HIGH REACTOR BUILDING PRESSURE and no higher priority procedure is indicated.

D. Plausible because Pressurizer level is 0%.

Incorrect because the first step in EOP-18.1 is to check if SI is in service and if it is to return to the procedure and step in effect and since RHR flow is indicated SI is still in service.

K/A: W/E08 RCS Overcooling-PTS G2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc

K/A Match: the K/A is met because the candidate must consider multiple parameters to assess the status of the critical safety functions including RCS integrity (Pressurized Thermal Shock potential) and containment conditions during an RCS overcooling event.

Selection criteria;

Tier: 1 **Group:** 2
Importance Rating: SRO 4.6
Technical Reference: EOPs-12.0, 15.0, 18.1

Proposed references to be provided to applicants during examination: Plant Operational Limits Curve from EOP-12.0

Learning Objective: EOP-12.0-05

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of the detailed content of FR-H.1 and FR-P.1 regarding when the procedures will be implemented. It cannot be answered with only RO knowledge (red and orange path entry criteria) because all of the procedures would be entered based on the parameters in the stem.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

18. 028G2.2.40 002/NEW//HIGHER//SRO/SUMMER/2/23/11/NO

Given the following plant conditions:

- A Large Break Loss of Coolant Accident has occurred.
- The operators are implementing EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT
- RB hydrogen concentration is **2.0%**

Which ONE (1) of the following statements identifies the number of Hydrogen Recombiners that will be started in accordance with EOP-2.0 and the design basis MAXIMUM below which hydrogen concentration will be maintained?

A. ONE (1) recombiner ONLY will be placed in service to keep Hydrogen concentration less than 0.5%

B.✓ ONE (1) recombiner ONLY will be placed in service to keep Hydrogen concentration less than 4.0%

C. BOTH recombiners will be placed in service to keep Hydrogen concentration less than 0.5%

D. BOTH recombiners will be placed in service to keep Hydrogen concentration less than 4.0%

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by MRB as a new question.
Ops Review: RT
Approved:RJ

DISTRACTOR ANALYSIS:

A. Plausible because the number of recombiners started is correct and this is the minimum concentration to energize the recombiners.

Incorrect because the design basis is to maintain hydrogen concentration below 4.0% and not 0.5%.

B. CORRECT. EOP-2.0 (E-1) starts only 1 recombiner and the design of the recombiner is to maintain hydrogen concentration below 4.0%.

C. Plausible because the EOP's typically start both trains even if each train is sufficient to accomplish the task and this is the concentration above which the recombiners are put in service.

Incorrect because only one recombiner is put in service in accordance with EOP-2.0 (E-1) and it is to maintain hydrogen concentration below 4.0%.

D. Plausible because the EOP's typically start both trains even if each train is sufficient to accomplish the task and the second part is correct.

Incorrect because only one recombiner is put in service in accordance with EOP-2.0 (E-1).

K/A: 028 Hydrogen Recombiner and Purge Control G2.1.27 Knowledge of the purpose and/or function.

Note: K/A was originally 028 G2.2.40

K/A Match: The K/A is met because the candidate must know the function of the recombiners (used one at a time) and the purpose (basis in FSAR which is part of the license).

Selection criteria; (note; Tech Spec sections 3.6.5 and 3.9.8 were deleted by Amend. 183). No existing bank questions were tied to this K/A. Searches for "purge" in stem or "Tech Specs" in objective field or generic part in K/A field returned only a couple of RO Rad Monitor questions which were already on the 2011 Audit or obsolete due to TS changes. New question written to match K/A.

Tier: 2 **Group:** 2
Importance Rating: SRO 4.0
Technical Reference: EOP-2.0 (E-1), FSAR chapter 6.

Proposed references to be provided to applicants during examination: None.

Learning Objective: EOP-2.0-06

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because tests detailed knowledge of EOP actions and requires knowledge of
NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

19. W/E13EA2.2 003/NEW//HIGHER//SRO/SUMMER/2/18/11/NO

Given the following plant conditions:

- The Reactor is Tripped
- All MSIVs are closed
- Steam Generator Narrow Range Levels:
  - A- 95% and increasing
  - B- 60% and stable
  - C- 63% and stable
- Steam Generator Pressures:
  - A- 1235 psig and increasing
  - B- 1130 psig and stable
  - C- 1130 psig and stable
- Secondary radiation is normal
- Operators have entered EOP-15.1, STEAM GENERATOR OVERPRESSURE.

Which ONE (1) of the following describes the procedure and the action that the CRS will use to mitigate the above conditions?

The CRS will:

A. Remain in EOP-15.1, STEAM GENERATOR OVERPRESSURE and dump steam from "A" Steam Generator.

B. Remain in EOP-15.1, STEAM GENERATOR OVERPRESSURE and dump steam from "B" and "C" Steam Generators.

C✓ Transfer to EOP-15.2, STEAM GENERATOR HIGH LEVEL and initiate blowdown from "A" Steam Generator

D. Transfer to EOP-15.2, STEAM GENERATOR HIGH LEVEL and steam using the Turbine-Driven Emergency Feedwater Pump

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

New for 2011 (wdb 2/16/11)
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because "A" steam generator has a high pressure and step 4 is attempts to dump steam to lower the pressure.

   Incorrect because step 3 of EOP-15.1 (FR-H.2), STEAM GENERATOR OVERPRESSURE, directs operators to transition to EOP-15.2 (FR-H.3), STEAM GENERATOR HIGH LEVEL with "A" steam generator level so high.

B. Plausible because "A" steam generator has a high pressure and since level in A is also high releasing steam from the "A" Steam Generator may introduce liquid into the main steam lines and cause water hammer. By releasing steam from the other two generators all three generators will cool off (connected through the primary) and so would depressurize the "A" steam generator.

   Incorrect because step 3 of EOP-15.1 (FR-H.2), STEAM GENERATOR OVERPRESSURE, directs operators to transition to EOP-15.2 (FR-H.3), STEAM GENERATOR HIGH LEVEL with "A" steam generator level so high.

C. CORRECT. Step 3 of EOP-15.1 (FR-H.2), STEAM GENERATOR OVERPRESSURE, directs operators to transition to EOP-15.2 (FR-H.3), STEAM GENERATOR HIGH LEVEL with "A" steam generator level so high. EOP-15.2, STEAM GENERATOR HIGH LEVEL will lower "A" level in step 10 by using blowdown

D. Plausible because the transition to EOP-15.2 (FR-H.3), STEAM GENERATOR HIGH LEVEL, is correct and the TDEFW pump would slowly release steam from the other two steam generators.

   Incorrect because the TDEFW pump does not accept steam from the "A" steam generator and no steam is released from a steam generator with such a high level even in small amounts.

/A: W/E13 Steam Generator Over-Pressure EA2.2 Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

K/A Match: the K/A is met because the candidate must adhere to procedures in a over-pressure situation to not steam from a overfilled generator and cause further damage to the main steam system.

Selection criteria; New.

Tier: 1 **Group:** 2
Importance Rating: SRO 4.6
Technical Reference: EOP 15.1 and 15.2
Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-15.2-05

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of the detailed content of content of procedure to make a decision on transition that is not entry into a major EOP.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

20. 000011G2.4.21 001/NEW//HIGHER//SRO/SUMMER/2/14/11/NO

Given the following plant conditions:

- A Large Break Loss of Coolant Accident occured fifteen minutes ago.
- Source range count rate is oscillating around 50,000 cps.
- Average startup rate is zero.
- RHR flow is 5600 gpm.
- RCS wide range pressure is 5 psig.
- RCS cold leg temperatures are between 255°F and 265°F.
- Containment radiation is 3 R/hr.
- Pressurizer level is 0%.

Which ONE (1) of the following procedures provides action that will be **EFFECTIVE** in mitigating the stated conditions?

A. EOP-13.1, RESPONSE TO LOSS OF CORE SHUTDOWN

B. EOP-16.1, RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK

C.✓ EOP-17.2, RESPONSE TO HIGH REACTOR BUILDING RADIATION LEVEL

D. EOP-18.1, RESPONSE TO LOW PRESSURIZER LEVEL

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

New for 2011 (wdb 2/14/11)

Rev. 1 Submitted by Matthew R. Bender based on RJ comments.
Reworded stem from which will be performed to completion since that terminology was confusing.
OPS Rep Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible because count rate is much higher than normal for this long after the trip. (This type of indication was mistaken for a loss of Shutdown Margin at TMI2)

Incorrect because the status tree entry is on startup rate, not count rate, to avoid unnecessary actions in response to voiding in the reactor vessel.

B. Plausible because the given temperatures meet the yellow path entry conditions of the Integrity status tree (i.e., between T1 and T2, 250°F and 285°F).

Incorrect because step 2. of the yellow path EOP-16.1(WOG FR-P.2) directs exit from the procedure if SI has not been terminated. Also, the logic of the Pressurized Thermal Shock procedures is that repressurization and PTS will not occur with a very large break in the RCS pressure boundary.

C. CORRECT per Containment status tree. Candidate must realize that EOP-17.2 is the only procedure that contains effective actions that will mitigate the high RB radiation conditions.

D. Plausible because the status tree yellow path entry conditions for EOP-18.1 (WOG FR-I.2) are met, PZR level is less than 17%.

Incorrect because step 1 of the yellow path EOP-18.1(WOG FR-I.2) directs exit from the procedure if SI has not been terminated. The logic of the procedure is that full SI flow and performance of the Optimum Recovery Guideline EOP-2.0 Loss of Reactor or Secondary Coolant (WOG E-1) will recover PZR level if possible (it is not possible for a DBA LOCA).

K/A: 000011 Large Break LOCA G2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.

K/A Match: the K/A is met because the candidate must know the parameters used to assess the critical safety functions and the logic used to decide whether to complete the relevant Functional Restoration Guidelines after a Large Break LOCA.

Selection criteria; 10 EOPS question dealt with selection of Functional Restoration Guidelines based on Critical Safety Function status tree parameters. 9 involved red or orange path procedures and were therefore RO knowledge. The one SRO question (EOPS 310) was short essay format. New question written for SRO-only knowledge (yellow path entry parameters).

Tier: 1 **Group:** 1
Importance Rating: SRO 4.6
Technical Reference: EOP-12.0 (WOG F-0) Critical Safety Function Status Trees

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-12.0-03

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of yellow path entry conditions and procedure content, which are not required for ROs, to select a procedure.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

21. 2.3.14 002/NEW//HIGHER//SRO/SUMMER/3/1/11/NO

Given the following plant conditions:

- The core is being offloaded.
- A fuel assembly is being lowered into the fuel transfer cart.
- The Reactor Cavity Seal Ring has failed.
- Cavity level is dropping rapidly.
- The crew is implementing AOP-123.1, DECREASING LEVEL IN THE SPEND FUEL POOL OR REFUELING CAVITY DURING REFUELING.

Which ONE (1) of the following statements identifies where the fuel assembly in transit should be placed and the bases for this action?

A. In the Reactor Vessel
To ensure the ability to cool the assembly.

B. In the Reactor Vessel
To avoid lethal dose rates in the reactor building.

C✓ In the fuel transfer cart with the cart down
To avoid lethal dose rates in the reactor building.

D. In the fuel transfer cart with the cart down
To avoid the performance of a core alteration.

PROVIDE COPY OFGOP-9 encl C

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible, this is one of the storage locations allowed by step 3 of the AOP and keeping the fuel covered assures cooling.

   Incorrect, this would require pulling the assembly back up into the mast and transiting the manipulator crane, raising dose rates and risking uncovering the fuel.

B. Plausible, this is one of the storage locations allowed by step 3 of the AOP and the second part is right.

   Incorrect, this would require pulling the assembly back up into the mast and transiting the manipulator crane, raising dose rates and risking uncovering the fuel.

C. CORRECT per step 3 of AOP-123.1and the CAUTION prior to the step.

D. Plausible, the location is right and step 4 does require "stop all core alterations".

   Incorrect, per TS Definition 1.9, "Suspension of CORE ALTERATION shall not preclude completion of movement of a component to a safe position."

K/A: Radiation Control 2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

K/A Match: The K/A is met because the candidate must determine the radiation hazard presented by an abnormal condition (loss of refueling cavity water level combined with fuel damage).

Selection criteria; No existing bank questions were tied to this K/A. None of the questions in the RADIATION objective were classified as SRO. Six questions in the FUEL HANDLING EQUIP objective were classified as SRO but they all involved interlocks (RO system knowledge, not related to "hazards". Bank question significantly modified to raise cognitive level and better match "hazard" part of K/A.

Tier:	3
Importance Rating:	SRO 3.8
Technical Reference:	AOP-123.1

Proposed references to be provided to applicants during examination: None.

Learning Objectives: AOP-123.1-03

10 CFR Part 55 Content: 43(b)7

SRO Justification: SRO Only because the question tests knowledge of Technical Specification bases other than safety limits.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments; WK include "most severe" radiation hazard.(done wdb) hard to work out depths. TL remembered from ILO class.

22. 2.3.12 002/MOD/VCS CLOSED/LOWER//SRO/SUMMER/3/1/11/NO

Given the following plant conditions:

- 20% power
- Operators are performing actions directed in OAP-108.1, Control of Reactor Building Entry

Which ONE (1) of the following identifies who will initiate the Reactor Building Entry Checklist and why the Escape Airlock is normally used to access the Reactor Building?

A. Health Physics Shift Leader;
Minimize force on the doors exerted by differential pressure

B. Health Physics Shift Leader;
Minimize exposure due to neutron streaming

C. Shift Engineer;
Minimize force on the doors exerted by differential pressure

D✓ Shift Engineer;
Minimize exposure due to neutron streaming

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a significant modification of ADMIN PROCEDURE 277
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. Plausible, HP Shift Leader will be involved in providing coverage for the entry and the smaller size of the doors on the Escape Airlock vs. the Personnel Airlock will limit the force.

Incorrect, SE initiates the checklist and the pressure will be equalized prior to opening the door.

B. Plausible, HP Shift Leader will be involved in providing coverage for the entry and the second part is right.

Incorrect, SE initiates the checklist.

C. Plausible, the first part is right and the smaller size of the doors on the Escape Airlock vs. the Personnel Airlock will limit the force.

Incorrect, the pressure will be equalized prior to opening the door.

D. CORRECT per OAP-108.1 Scope 2.3 and CAUTION before step 6.4.

K/A: Radiation Control 2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

K/A Match: The K/A is met because the candidate must evaluate the radiological safety principles (neutron streaming due to reactor operation) during containment entry under the given conditions.

Selection criteria; The only existing bank question tied to this K/A was already on the audit. 9 existing questions had OAP-108.1 CONTROL OF REACTOR BUILDING ENTRY as a reference, but none were based on "radiological safety principles". Modified one of the two SRO questions to add radiological element and raise the cognitive level.

Tier: 3
Importance Rating: SRO 3.7
Technical Reference: OAP-108.1

Proposed references to be provided to applicants during examination: None

Learning Objective: OAP-108.1-03

10 CFR Part 55 Content: 43(b)4

SRO Justification: SRO Only because the question tests knowledge of Shift Engineer (STA) responsibilities.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

23. 2.1.4 003/MOD/VCS CLOSED/KNOWLEDGE//SRO/SUMMER/2/25/11/NO

Given the following plant conditions:

- 100% power
- The BOP must be relieved due to sickness during the **MONDAY NIGHT** shift.

Which ONE (1) of the following statements identifies how long the BOP position may be vacant in order to accommodate the unexpected absence of the BOP and the preferred relief in accordance with OAP-100.2, OPERATIONS PERSONNEL EXPECTATIONS AND RESPONSIBILITIES?

A.✓ Two (2) hours

Licensed individual on days off

B. Four (4) hours

Licensed individual on days off

C. Two (2) hours

Licensed individual on Admin shift

D. Four (4) hours

Licensed individual on Admin shift

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY: (as ADMIN PROCEDURE 161)

Rev. 0 Submitted as a major modification of ADMIN PROCEDURE 161
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. CORRECT per OAP-100.2, OPERATIONS PERSONNEL EXPECTATIONS AND RESPONSIBILITIES and SAP-200, CONDUCT OF OPERATIONS.

B. Plausible because this is the amount of time that an individual can be held over from one shift to another and the second part is correct.

Incorrect because the position can only left vacant for two hours.

C. Plausible because the first part is correct and an operator on the admin shift would be correct during the day.

Incorrect because the relief is to be at night.

D. Plausible because this is the amount of time that an individual can be held over from one shift to another and an operator on the admin shift would be correct during the day.

Incorrect because the relief must come in within 2 hours and since it is night a person on days off must be called in.

K/A: Conduct of Operations 2.1.4 Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.

K/A Match: the K/A is met because the candidate must know the responsibilities related ensuring shift staffing.

Selection criteria; New.

Tier: 3
Importance Rating: SRO 3.8
Technical Reference: OAP-100.2, SAP-200

Proposed references to be provided to applicants during examination: None

Learning Objective: OAP-100.2-04

10 CFR Part 55 Content: 43(b)2

SRO Justification: SRO Only because the question tests knowledge of ensuring manning , which is an SRO function. SAP-200 lists the Shift Supervisor (SRO) as responsible for the manning of the shift.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

24. 2.1.3 002/NEW//KNOWLEDGE//SRO/SUMMER/2/25/11/NO

Given the following plant conditions:

- The Unit is in Mode 2.
- A reactor startup is in progress per GOP-3, REACTOR STARTUP FROM HOT STANDBY TO STARTUP.
- The reactor operator is withdrawing rods on the approach to criticality

Which ONE (1) of the choices below correctly identifies the following:

a) Whether the CRS can start a turnover with the on-coming CRS in accordance with GOP-Appendix A?

b) An item that must be initialed for review on the Control Room Supervisor Relief Checklist in accordance with OAP-100.6, Control Room Conduct and Control of Shift Activities?

A.✓ Turnover will not begin during the approach to criticality.
The CRS must initial for review of the Removal and Restoration Log.

B. Turnover will not begin during the approach to criticality.
The CRS must initial for review of the status of Security Keys.

C. Turnover may begin as long as distractions are minimized.
The CRS must initial for review of the Removal and Restoration Log.

D. Turnover may begin as long as distractions are minimized.
The CRS must initial for review of the status of Security Keys .

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY:

Rev. 0 Submitted by RJ as a new question.
Ops Review: RT
Approved: RJ

DISTRACTOR ANALYSIS:

A. CORRECT per GOP-App. A 2.8.a and OAP-100.6 Att. VIII pg.2.

B. Plausible because the first part is right and the keys are on the *Shift Supervisor* Relief Checklist.

Incorrect, keys are not on the *CRS* checklist.

C. Plausible, GOP-A 2.8a does call for minimizing distractions during StartUp and the second part is right.

Incorrect, turnover is not permitted by GOP-A 2.8a.

D. Plausible, GOP-A 2.8a does call for minimizing distractions during StartUp and the keys are on the *Shift Supervisor* Relief Checklist.

Incorrect, keys are not on the *CRS* checklist and turnover is not permitted by GOP-A 2.8a.

K/A: Conduct of Operations 2.1.3 Knowledge of shift or short-term relief turnover practices.

K/A Match: The K/A is met because the candidate must know the requirements for shift turnover.

Selection criteria; 9 existing bank questions were tied to this K/A. The selected question was the only one rated as SRO, the rest concerned actions ROs or AOs take during their turnover, which made them RO knowledge.

Tier: 3
Importance Rating: SRO 3.9
Technical Reference: GOP-App. A, OAP-100.6

Proposed references to be provided to applicants during examination: None

Learning Objective: GOP-A-02

10 CFR Part 55 Content: 43(b)6

SRO Justification: SRO Only because the question tests knowledge of CRS control of turnover during a critical reactivity manipulation (reactor startup).

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

25. 2.4.37 003/MOD/VCS CLOSED/KNOWLEDGE//SRO/SUMMER/3/2/11/NO

Given the following plant conditions:

- A Large-break LOCA has occurred
- A Site Area Emergency was declared two (2) hours ago
- The Emergency Response Organization (ERO) is **fully manned**.
- Plant conditions are being evaluated for a potential declaration of a General Emergency

Which ONE (1) of the choices below identifies the following:

(1) The lowest position in the ERO with the authority to direct plant manipulations that are contrary to the Emergency Operating Procedures in order to protect the public?

(2) The person in the ERO who will determine whether a General Emergency should be declared?

A. (1) Shift Supervisor
(2) Shift Supervisor

B.✓ (1) Shift Supervisor
(2) Emergency Director

C. (1) Emergency Director
(2) Shift Supervisor

D. (1) Emergency Director
(2) Emergency Director

QUESTION USAGE:

2011 NRC SRO

QUESTION HISTORY: (as EPPS/FEPS 33)

Rev. 0 Submitted as a significant modification of EPPS/FEPS 33 based on RJ comment. Added second half of question as SS responsibility during accident.

DISTRACTOR ANALYSIS:

A. Plausible, the first part is right and the SS could make the declaration as IED *prior* to the ERO being manned.

Incorrect after the ERO is manned.

B. CORRECT per OAP-103.4 section 6.14 and EPP-001 5.2.C.

C. Plausible, the right positions are identified.

Incorrect, the responsibilities are reversed.

D. Plausible, the second part is right.

Incorrect, OAP-103.4 requires the SS to make the procedure deviation.

K/A: Emergency Procedures / Plan 2.4.37 Knowledge of the lines of authority during implementation of the emergency plan.

K/A Match: The K/A is met because the candidate must know who has authority to upgrade the emergency classification of an event.

Selection criteria; three existing bank questions (ADMIN PROCEDURE 345, EPPS/FEPS 10 and 208) where tied to this K/A (as well as multiple duplicates of 208). Checking all EPPS/FEPS objective questions found #33 which was tied to 2.4.39 but also concerned "authority". The selected question was the best fit for "authority" with the highest operational relevance (most significant action). Added second part because 2 choices were not as plausible.

Tier: 3
Importance Rating: SRO 4.1
Technical Reference: EPP-001, OAP-103.4

Proposed references to be provided to applicants during examination: None

Learning Objective: 4111 (in EPP-001.3 LP for SRO)

10 CFR Part 55 Content: 43(b)5

SRO Justification: SRO Only because the question tests knowledge of Shift Supervisor authority during implementation of the Emergency Plan.

NRC Form ES-401-9 Comments (2011 NRC Exam):

Facility Response:

comments;

You have completed the test!

Facility: VC SUMMER	Scenario No.: 1	Op Test No.: **2011 NRC**
Examiners: ______	Operators:	CRS
______		RO
______		BOP

Initial Conditions:	• IC-10, 100% Power, MOL (IC-301 for 2011)
	• "B" EDG is OOS to clean the lube oil strainer
	• "B" RB spray pump is out of service for bearing replacement
	• National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area
Turnover:	• Maintain current conditions
Critical Task:	• Transfer rods to MANUAL before going below Rod Insertion Limit
	• Transfer 1DA to 230KV power and restart "A" MDEFW Pump OR Reset Feedwater Isolation Signal and establish feed from FW Booster Pumps before SG dryout

Event No.	Malf. No.	Event Type*	Event Description
1.	NIS007G	I-RO, BOP TS– CRS	Power Range upper detector NI-44A fails high RO1, BOP1
2.	FWM009A	C– BOP, CRS	HP heater tube leak BOP2
3.	N/A	N– BOP, CRS R-RO	Reduce power to isolate HP FW heater string
4.	EPS018A&B and EPS-006A IND ES071 & 073=>0	C – RO,BOP TS-CRS	115KV offsite power is lost, the "A" EDG rolls but trips: 1DA is deenergized. RO Must start "B" train CCW pump and charging pump. BOP will start restoration of 1DA. RO2
5.	PCS013B	M-ALL	Inadvertent FW Isolation Signal, Train B
6.	FWM003B	C– BOP, CRS	"B" MDEFW pump fails to start
7.	VLV-MS001F	C– BOP, CRS	FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available
			Terminate when Main or Emergency Feedwater is restored OR Feed and Bleed has been initiated

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

DRAFT

VC Summer NRC Scenario #1 Summary

The crew will assume the watch having pre-briefed on the Initial Conditions (stable full power, middle of life, A1 Maintenance week). The plan for this shift is to maintain present conditions and continue work on the "B" EDG and "B" RB Spray Pump.

Power Range N44 upper detector A fails high as indicated by channel and delta I deviations. Power mismatch will result in inward rod motion. The RO will place control rods in MANUAL to avoid exceeding the Rod Insertion Limit and the CRS will enter AOP-401.10 POWER RANGE CHANNEL FAILURE to bypass the failed channel and identify Tech Spec Table 3.3-1 items 2,3,19 which requires actions 2 and 7 required monitoring of Quadrant Power Tilt Ratio. The BOP will take the channel out of service at the NIS panels.

When control room actions for the failed NI are complete, the Lead Evaluator can cue a tube leak in HP Feedwater Heater 1A. The leak is large enough to cause automatic shell-side isolation of the "A" string of HP feedwater heaters by the DCS. The crew will enter AOP-204.1, LOSS OF HIGH PRESSURE FEEDWATER HEATERS, and reduce power to 925MWe (approx. 92% RTP) at 3% per minute. The BOP will start the standby condensate pump to compensate for the FW heater dumping to the condenser (Deaerator Storage Tank level will drop, which would eventually lead to loss of all Feedwater pumps.)

When isolation of the tube side of the leaking HP heater string is directed, the Lead Evaluator can cue the booth operator to insert the loss of 115KV power. Due to the unavailability of the "A" DG, power is lost to 1DA ("A" train ESF power) and all running essential equipment. The crew will enter AOP-304.1 LOSS OF BUS 1DA WITH THE DIESEL NOT AVAILABLE. CRS will evaluate Technical Specification 3.8.1.1.a for availability of Offsite Sources. Restoration of 1DA from the Emergency Aux Transformer (230KV) will be delayed by an inoperable alternate incoming breaker.

When the evaluation of the loss of "A" Train ESF power is complete and Component Cooling Water and Charging restored, the Lead Evaluator can cue the booth operator to insert the Inadvertent Feedwater Isolation Signal. This isolates Main Feedwater with no EFW pumps available. Crew will progress through EOP-1.0 REACTOR TRIP/SAFETY INJECTION ACTUATION and EOP-15.0 RESPONSE TO LOSS OF SECONDARY HEAT SINK . SG heat sink will then be restored either by completing the restoration of power to 1DA and using the "A" MDEFW pump <u>or</u> bypassing the FWIS and using the Feedwater Booster Pumps. The scenario can be terminated either 1) after feed is restored or 2) after PORVs are closed and SI flow reduced at Lead Evaluator discretion.

VCS 2011 NRC Scenario 1 Simulator Setup

Initial Conditions:

- IC-10, 100% power, MOL.
- Reactivity Management Plan/Turnover sheet for IC
- "B" EDG and "B" RB Spray pump are OOS
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires.

VCS 2011 NRC Scenario 1 Simulator Setup (SNAP 301)

- Conduct two-minute drill
- Mark up procedures in use with "Circle and slash" as applicable

Pre-Exercise:

Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.)

TQP-801 Booth Operator checklist, has been completed

Hang red tags and Removal and Restoration tags on "B" RB Spray Pump and "B" EDG control switches

PRE-LOAD

- MAL EPS006A = Fail "A" EDG fails to autostart, will not start manually or locally
- VLV MS001F FCV-2030 fails as-is (closed)
- LOA AUX118 = RACK OUT ("B" RB Spray pump OOS)
- LOA-EPS114 = MAINTENANCE ("B" EDG OOS)
- MAL FWM003B "B" MDEFW Pp fails to start
- Override STL-ES007 (86 XTF-4) to OFF
- Override STL-ES008 (86 XTF-5) to OFF
- LOA-AUX050, SFP HX 1B DISCH ISOL VLV Set=0.9
- LOA-AUX048, CROSS-TIE ISOL VLV Set=1
- LOA-AUX073, SPENT FUEL POOL PUMP B SWITCH Set=ON

EVENT 1: Power Range Detector NI-44A fails high

- Trigger 1
- Malfunction NIS007G = 5 ma, 2 minute ramp
- No local actions, circuit will not be repaired

EVENT 2: Leak on 1A High Pressure feedwater heater

- Trigger 2
- Malfunction FWM009A=3E6 (3 million pounds mass/hour) ramp over 5 minutes HP heater tube leak
- "A" heater string will auto-isolate on high level
- Damage will not be repaired

EVENT 4: 115KV offsite power is lost

- Trigger 4
- Currently Malfunctions EPS018A&B
- Parr switchyard is impacted by tornado, will not be restored during scenario
- Bus 1DA is lost due to failure of "A" Emergency Diesel Generator to start
- CCW non-essential supply valves powered by "A" train must be locally operated (Trigger 6)
- Bus may be restored during EOP-15.0 by deenergizing sequencer (LOA EPS136)

EVENT 5: Inadvertent Train B Feedwater Isolation

- Trigger 5
- Malfunction PCS013B = INDAVERTANT INIT
- Signal may be bypassed per EOP-15.0 using trigger 7

TRIGGER 6: local transfer of non-essential CCW loads to "B" train

- Trigger 6
- VLV CC006P = 0% 45 sec. ramp (MVB-9524A and 9526A closed using Limitorque local handwheel)
- VLV CC009P = 100% 45 sec. ramp, 45 sec TD (MVB-9687B and 9525B opened using Limitorque local handwheel)

TRIGGER 7: local bypass of feedwater isolation

- LOAs FWM-040,041, and 042 = BYPASS

Trigger 8: Deenergize Train A Loading Sequencer

- ANN-SG012 ESFLS (A) DOOR OPEN XCP 636
- LOA-EPS136, LOAD SEQUENCER A:CONTROL POWER SWITCH Set=OPEN 30 second TD

Trigger 9: Transfer 1FC1 to 1FB

- LOA-EPS171 APN-1FC1 to Power Selector switch for DRPI when requested Set = 1FB

Trigger 10; HVAC annunciator/horn acknowledge

- LOA-AUX078 to OFF

Trigger 11; Bypass and isolate "A" HP heater string (announce time compression)

- LOA-FWM031 = 1.0, 1 minute ramp
- LOA FWM029 = 0.0, 1 minute ramp 1 minute time delay

Op Test No.:	2011 NRC	Scenario #	1	Event #	1	Page	6 of 49
Event Description:	Power Range upper detector NI-44A fails high						

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, insert Trigger 1.**		
Indications available: **Uncontrolled Rod Motion** **XCP-620 1-1, PR HI SETPT FLUX HI** **XCP-620 2-2, PR FLUX HI RATE SINGLE CHAN ALERT** **XCP-621 2-4, PR FLUX HI ROD STP**		
Evaluator's Note: The crew could enter the ARPs but it is more likely that they will recognize the entry condition for AOP-401.10, POWER RANGE CHANNEL FAILURE.		
	CRS	Enters AOP-401.10, POWER RANGE CHANNEL FAILURE
IOA	RO	Verify normal indication on Power Range Channel N-44. **(NO)**
IOA & CRITICAL TASK	RO	If Power Range Channel N-44 has failed, THEN place the ROD CNTRL BANK SEL Switch in MAN **(Prior to rods going below the RIL)**
IOA	Crew	Stabilize any plant transients in progress.
*	Crew	Maintain stable plant conditions.
	Crew	Verify no testing is in progress on the operable Power Range channels

Op Test No.: 2011 NRC Scenario # 1 Event # 1 Page 7 of 49

Event Description: Power Range upper detector NI-44A fails high

Time	Position	Applicant's Actions or Behavior
	RO	Place ROD STOP BYPASS Switch (on the MISCELLANEOUS CONTROL AND INDICATION PANEL) for the failed Power Range channel **(N-44)** in BYPASS.
	RO	Verify the appropriate Rod Stop Bypass status light is bright: • For N-41, A1 OP ROD STOP BYP (XCP-6111 4-1). • For N-42, B1 OP ROD STOP BYP (XCP-6111 4-2). • For N-43, A2 OP ROD STOP BYP(XCP-6111 4-3). • **For N-44, B2 OP ROD STOP BYP (XCP-6111 4-4).**
	RO	Adjust Control Rods to maintain Tavg within 1.0 °F of Tref
	Crew	Notify the I&C Department to record detector currents and status lights on POWER RANGE A and POWER RANGE B drawers

Booth Operator Instructions:
When called as I&C to record detector currents and status lights report that the necessary data has been collected.

Evaluator Note:
The recording of data by I&C would be done in the control room so the booth operator is compressing time and the operators will not see an individual record data (it may be necessary to cue the crew as to these facts).

CAUTION - Step 9

The empty fuse holders should NOT be reinstalled as this will allow a small amount of current flow through the blown fuse indicator.

Op Test No.: 2011 NRC	Scenario # 1	Event # 1	Page 8 of 49
Event Description:	Power Range upper detector NI-44A fails high		

Time	Position	Applicant's Actions or Behavior
	BOP	Deenergize the failed Power Range channel: **(N-44)** a. Remove the CONTROL POWER fuses from the POWER RANGE A drawer. b. Remove the INSTR POWER fuses from the POWER RANGE B drawer.
	BOP	Align the Power Range channel comparator circuits: a. Place the following switches to the failed Power Range channel position: **(N-44)** 1) COMPARATOR CHANNEL DEFEAT Switch (on the COMPARATOR AND RATE drawer). 2) UPPER SECTION Switch (on the DETECTOR CURRENT COMPARATOR drawer). 3) LOWER SECTION Switch (on the DETECTOR CURRENT COMPARATOR drawer).
	RO	Ensure NR-45 is selected to the appropriate operable channels.
	Crew	Check if Reactor power is LESS THAN 75% **(NO)**
	Crew	Initiate GTP-702, Attachment IV.F.
Evaluator Note: **GTP-702 Attachment IV.F requires that STP0108.001 be performed every 12 hours. Since the scenario will not last that long it is assumed that STP0108.001 will not be performed.**		
	Crew	Check if Reactor power is LESS THAN 50% **(NO)**
	Crew	Initiate GTP-702, Attachment IV.D

Op Test No.: 2011 NRC	Scenario # 1	Event # 1	Page 9 of 49
Event Description:	Power Range upper detector NI-44A fails high		

Time	Position	Applicant's Actions or Behavior
Evaluator Note: **GTP-702 Attachment IV. D requires that STP0133.001 be performed once per hour. Since the scenario will not maintain power above 50% for the next hour it is assumed that STP0133.001 will not be performed.**		
	CRS	Within 72 hours, place the failed channel protection bistables in a tripped condition: **(N/A)**
Evaluator Note: **The other three channels would require tripping of additional bistables. The only bistables for N-44 are in the NIS Racks and are already tripped.**		
	CRS	Refer to Tech Spec 3.3.1
	CRS	From Table 3.3-1 Functional Units 2 & 3 require action 2# and Function Unit 19 requires action 7

Event Description: Power Range upper detector NI-44A fails high

Time	Position	Applicant's Actions or Behavior

Action 2

With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours. **DONE**
b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.1.1.
c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

4.2.4.1 The QUADRANT POWER TILT RATIO shall be determined to be within the limit above 50% of RATED THERMAL POWER by:
a. Calculating the ratio at least once per 7 days when the alarm is OPERABLE.
b. Calculating the ratio at least once per 12 hours during steady state operation when the alarm is inoperable.

4.2.4,2 The QUADRANT POWER TILT RATIO shall be determined to be within the limit when above 75 percent RATED THERMAL POWER with one Power Range Channel inoperable at least once per 12 hours by using the PDMS or movable incore detectors to confirm that the normalized symmetric power distribution is consistent with the indicated QUADRANT POWER TILT RATIO. The incore detector monitoring shall be done with 2 sets of 4 symmetric thimbles or a full incore flux map. **GTP-702 Attachment IV.F**

Action 7

With less than the Minimum Number of Channels OPERABLE, within one hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3. **P-7, P-8, P-10, P-9**

	Crew	Verify proper status of P-7, P-8, P-10, & P-9

Op Test No.:	2011 NRC	Scenario #	1	Event #	1	Page	11 of 49
Event Description:	Power Range upper detector NI-44A fails high						

Time	Position	Applicant's Actions or Behavior
		4.2.1.1 The indicated AFD shall be determined to be within its limits during POWER. OPERATION above 50% of RATED THERMAL POWER by: a. Monitoring the indicated AFD -for each OPERABLE excore channel at least once per 7 days when the AFD Monitor Alarm is OPERABLE: b. Monitoring and logging the indicated AFD for each OPERABLE excore channel at least once per hour for the first 24 hours and at least once per 30 minutes thereafter, when the AFD Monitor Alarm is inoperable. The logged values of the indicated AFD shall be assumed to exist during the interval preceding each logging. **GTP-702 Attachment IV.D**
		Once TS implications are identified, proceed to the next event.

Op Test No.: 2011 NRC	Scenario # 1 Event # 2 & 3	Page 12 of 49
Event Description:	HP heater tube leak, Reduce power to isolate HP FW heater string	
Time	Position	Applicant's Actions or Behavior

Booth Operator Instructions:
When directed, insert Trigger 2

Indications available:
XCP-627 2-3, FW HTR 1,2,4 ISOLATE/LVL HI-HI

Time	Position	Applicant's Actions or Behavior
	BOP	Responds to alarm XCP-627 2-3, FW HTR 1,2,4 ISOLATE/LVL HI-HI.
	BOP	Enters ARP-001-627 2-3.
		PROBABLE CAUSE: 1. Failure of the heater level control system(s). 2. Any HTR 1(A or B), 2(A or B) or 4(A or B) in ISOLAT (manually or automatic).
		AUTOMATIC ACTIONS: 1. The following will occur to the heater with the High-High level: a. The extraction steam check valve and isolation valve close. **(YES)** b. The emergency drain valve to the Condenser opens fully. c. For Heaters 1A(B) only, the drain from the Reheater Drain Tank closes. **(YES)** d. For Heaters 2A(B) only, the drain from the Moisture Sep Drain Tank closes. **(NO)** e. For Heaters 2A(B) only, the drain from Heater 1A(B) closes. **(NO)**

NOTE

This alarm has reflash capabilities.

Op Test No.: 2011 NRC	Scenario # 1	Event # 2 & 3	Page 13 of 49				
Event Description:	HP heater tube leak, Reduce power to isolate HP FW heater string						

Time	Position	Applicant's Actions or Behavior
		CORRECTIVE ACTIONS: 1. Determine which heater is ISOLATED using DCS screens 101 thru 110. 2. For Heaters 1A(B) or 2A(B) go to AOP-204.1 **(YES)**.
	CRS	Go to AOP-204.1, LOSS OF HIGH PRESSURE FEEDWATER HEATERS
NOTE - Step 1 Entering CNTRL-ALT-S on the EHC keyboard is the preferred method to accomplish a rapid load reduction during FW Heater transients.		
IOA	BOP	Verify Turbine Load is LESS THAN 950 MWe **(NO)**
IOA	BOP	Using any method available, reduce Turbine Load by 40 MWe to 50 MWe
	BOP	Verify Turbine Load is GREATER THAN 700 MWe **(YES)**
*	CREW	Monitor DELTA T PWR on ZZMENU (Screens 1 and 2) on the IPCS
	BOP	Verify the following are NOT ISOLATED: • HEATER #2A. • HEATER #2B • MS DRN TANK A. • MS DRN TANK B. **(YES)**

Op Test No.:	2011 NRC	Scenario #	1	Event #	2 & 3	Page	14	of	49
Event Description:	HP heater tube leak, Reduce power to isolate HP FW heater string								

Time	Position	Applicant's Actions or Behavior
	BOP	Verify the following are NOT ISOLATED: • HEATER #1A. • HEATER #1B • RH DRN TANK A. • RH DRN TANK B. **(NO)**
Booth Operator Instructions: **If contacted as Turbine Operator, report High level in the #2 heater sightglass, Normal and Emergency Drain valves (3763A & 3763B) are fully open.**		
	BOP	Reduce Turbine Load at 3%/MIN until one of the following has been met: • If only one #1 Heater or RHDT is ISOLATED, THEN reduce load to LESS THAN 925 MWe **(YES)** OR • If two or more #1 heaters or RHDTs are ISOLATED, THEN reduce load to LESS THAN 850 MWe **(NO)**
	BOP	Verify DA level is stable at or trending to normal operating band. **(NO)**
	BOP	Start the remaining Condensate Pump per the following: a) Ensure XVB-614A(B)(C), A(B)(C) DISCH ISOL, is closed for the pump to be started. b) Start the remaining Condensate Pump. c) Open XVB-614A(B)(C), A(B)(C) DISCH ISOL, for the remaining Condensate Pump.
NOTE - Step 7 Following the Turbine Power Reduction, Xenon levels may increase. Tavg should be maintained at Tref by Control Rod movement or RCS dilution. Reactor Engineering should be contacted for a long term reactivity management plan.		

Op Test No.: 2011 NRC	Scenario # 1	Event # 2 & 3	Page 15 of 49
Event Description: HP heater tube leak, Reduce power to isolate HP FW heater string			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When called as Reactor Engineering for a long term reactivity management plan report that a reactivity management plan is being developed.**		
	RO	Maintain the following operating limits: a. Axial Flux Difference within the target band. Check the RAOC or BASELOAD display on the IPCS. b. Control Rods above RIL: • Check the RIL display on the IPCS. • Verify CRB INSERT LMT LO-LO (XCP-621 1-1), annunciator is NOT lit. ' c. Steady state power level. REFER TO GOP-4B, POWER OPERATION (MODE 1 - DESCENDING). d. Main Generator reactive load LESS THAN 325 MVAR.
	BOP	When no longer required to maintain DA level, secure Condensate Pumps as necessary per SOP-208.
Booth Operator Instructions: SOP-204 IV.A may be used to isolate the leaking heater. **If contacted as Turbine Operator to open XVT01609 bypass and close XVK01626A and XVK01608 isolations, use Trigger 11 to do so.**		
At the discretion of the lead examiner, proceed to the next event.		

Op Test No.: 2011 NRC	Scenario # 1	Event # 4	Page 16 of 49
Event Description:	115KV offsite power is lost, 1DA is deenergized		

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, insert Trigger 4**		
Indications available: **Buss potential lights on 1DA are out** **Trip alarm for A charging pump** **DG A AUTOSTART NOT READY alarm**		
	CRS	Enters AOP-304.1(A), LOSS OF BUS IDA WITH THE DIESEL NOT AVAILABLE
NOTE This procedure assumes a loss of XSW1DA has occurred due to one of the following reasons: • A loss of the offsite power source occurred. • An XSW1DA Bus lockout has occurred.		
NOTE - Steps 1 through 5 The installed spare components (C Pumps or Chillers) may be aligned and started for Train B operation if the Train B components are NOT available.		
	RO	Ensure a Train B Component Cooling Pump is running: • XPP-0001B, PUMP B. **(STARTS)** OR • XPP-0001C, PUMP C TRAIN B.
	RO	Ensure a Train B Charging Pump is running: • XPP-0043B, PUMP B. **(STARTS)** OR • XPP-0043C, PUMP C TRAIN B.

Op Test No.:	2011 NRC	Scenario #	1	Event #	4	Page	17 of 49
Event Description:	115KV offsite power is lost, 1DA is deenergized						

Time	Position	Applicant's Actions or Behavior
		NOTE - Step 3 On a loss of power to MVG-9600, TO THERM BARR ISOL, from XSW1DA2X, the Component Cooling Water Booster Pumps will not start due to an open contact in the start circuit.
	RO	Verify Component Cooling Water Loop B is the Active Loop. **(NO)**
	RO	Close the following Charging and Letdown Valves: a) PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. b) LCV-459 and LCV-460, LTDN LINE ISOL. c) FCV-122, CHG FLOW. d) HCV-142, LTDN FROM RHR.
	RO	Establish Component Cooling Water Loop B as the Active Loop. REFER TO SOP-118, COMPONENT COOLING WATER.
	RO	Ensure MVB-9503B, CC TO RHR HX B, is open
		CAUTION 2.4.c and 2.4.d Failure to complete Step 2.4.d in a timely manner after reducing RHR Heat Exchanger flow will result in a loss of flow through the running CCW Pump or excessive flow perturbations in the CCW non-essential loop.

Op Test No.:	2011 NRC	Scenario #	1	Event #	4	Page	18	of 49
Event Description:	115KV offsite power is lost, 1DA is deenergized							

Time	Position	Applicant's Actions or Behavior
	RO	Start MVB-9503B, CC TO RHR HX B, stroking in the closed direction. **(PEER ✓)** When flow, as indicated on FI-7044, HX B FLOW GPM, is between 5000 gpm and 4000 gpm, perform the following in rapid succession: 1) Open MVB-9687B/9525B, LP B NON-ESSEN LOAD ISOL. 2) Open MVB-9524B/9526B, LP B NON-ESSEN LOAD ISOL. 3) Close MVB-9524A/9526A, LP A NON-ESSEN LOAD ISOL. 4) Close MVB-9687A/9525A, LP A NON-ESSEN LOAD ISOL. 5) Open MVB-9503A, CC TO RHR HX A.
	RO	Locally direct positioning of A Train Valves
Booth Operator Instructions: Use SOP-118 section V.A; When called to close MVB-9524A and 9526A, A NON-ESSEN LOAD ISOL, and open MVB-9687B and 9525B, LP B NON-ESSEN LOAD ISOL, use Trigger 6 to do so.		
	RO	Locally verify greater than 1 gpm sample flow on RML0002B, LIQUID RAD MON COMPONENT COOLING (IB-412).
Booth Operator Instructions: When called to report flow to RML-2B report > 5 gpm.		
	RO	Ensure the following valves have not automatically closed due to high flow: 1) MVG-9625, CC TO RB. 2) MVG-9626, CC TO RB. 3) MVG-9583, FROM XS LTDN HX. 4) MVT-9593A(B)(C), FROM RCP A(B)(C) THERM BARR.
	RO	Check if a Train B Service Water Pump is running: • XPP-0039B, PUMP B. **(YES)** OR • XPP-0039C, PUMP C TRAIN B.

Op Test No.:	2011 NRC	Scenario #	1	Event #	4	Page	19	of	49
Event Description:	115KV offsite power is lost, 1DA is deenergized								

Time	Position	Applicant's Actions or Behavior
	Crew	Ensure HVAC Chilled Water Loop B is operating: • XPP-48B, PUMP B, AND XHX-1B, CHILLER 1B, are running. **(STARTS)** OR • XPP-48C, PUMP C TRAIN B, AND XHX-1C, CHILLER C TRAIN B, are running.
	Crew	Check if RHR cooling is required. **(NO)**
	CRS	GO TO Step 8
	RO	Ensures Instrument Air Compressor B is running **(YES)**
	RO	WHEN Component Cooling Water is available for non-essential loads, THEN verify Letdown flow on FI-150, LO PRESS LTDN FLOW GPM **(NO)**
Booth Operator Instructions: **If called as Intermediate Building Operator, report A EDG stopped, receiver pressure at 375 psig with compressor running, EMERG START and EMERGENCY SHUTDOWN alarms in. A large oil leak is found on the Governor, Mechanical Maintenance has been contacted.**		
	RO	Set PCV-145, LO PRESS LTDN, to 70%.
	RO	Fully open TCV-144, CC TO LTDN HX.
	RO	Place TCV-143, LTDN TO VCT OR DEMIN, in VCT position.

Op Test No.: 2011 NRC	Scenario # 1	Event # 4	Page 20 of 49
Event Description:	115KV offsite power is lost, 1DA is deenergized		

Time	Position	Applicant's Actions or Behavior
	RO	Open PVT-8152, LTDN LINE ISOL.
	RO	Open both LCV-459 and LCV-460, LTDN LINE ISOL.
	RO	Slowly adjust FCV-122, CHG FLOW, to obtain 70 gpm Charging flow.
	RO	Open desired Orifice Isolation Valve(s) to obtain 60 gpm to 120 gpm: • PVT-8149A, LTDN ORIFICE A ISOL (45 gpm). • PVT-8149B, LTDN ORIFICE B ISOL (60 gpm). • PVT-8149C, LTDN ORIFICE C ISOL (60 gpm).
	RO	Adjust FCV-122, CHG FLOW, to maintain TI-140, REGEN HX OUT TEMP °F, between 250"F and 350 °F while maintaining PZR level.
	RO	Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig.
	RO	Place PCV-145, LO PRESS LTDN, in AUTO.
	RO	Place TCV-144, CC TO LTDN HX, in AUTO.
	RO	Ensure Letdown temperature is stable.
	RO	Place TCV-143, LTDN TO VCT OR DEMIN, in DEMIN/AUTO position.

Op Test No.: 2011 NRC	Scenario # 1 Event # 4	Page 21 of 49
Event Description:	115KV offsite power is lost, 1DA is deenergized	
Time	Position	Applicant's Actions or Behavior
	RO	Verify 60 gpm to 120 gpm on FI-150, LO PRESS LTDN FLOW GPM.
	RO	Verify PZR level is stable at OR trending to program level.
	Crew	Ensure Spent Fuel Cooling Loop B is in service. REFER TO SOP-123, SPENT FUEL COOLING SYSTEM.
	Crew	Directs ABLL to ensure Spent Fuel Cooling Loop B is in service.
Booth Operator Instructions: **If called to ensure Spent Fuel Cooling Loop B is in service report that it is.**		
	Crew	Place the following Control Switches in PULL TO LK NON-A: • Charging Pump A. • Charging Pump C (Train A). • Emergency Feedwater Pump A.
	BOP	REFER TO ARP-001 XCP-633 through 641, ANNUNCIATOR RESPONSE PROCEDURE, for annunciator(s) in alarm.
	Crew	Dispatch operators to the following areas to locally investigate for problems: • XTF0004 and XTF0005, ESF Transformers. • XTF0031, Emergency Aux Transformer #1. • XSW1DA. • XCX5201, Diesel Generator A Local Control Panel. • GENERATOR & XFMR ELECTRICAL RELAY BOARD (CB-463), XCP6221A-EG and XCP6225-EG.

Op Test No.: 2011 NRC	Scenario # 1	Event # 4	Page 22 of 49
Event Description:	115KV offsite power is lost, 1DA is deenergized		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When called to investigate the electrical problem report that there is no apparent damage to 1DA, no flags, no smoke or odor.** **When called to investigate the "A" DG report that the governor has a large oil leak and no visible oil level, mechanics are preparing to replace the governor with a spare .**		
	Crew	Consult with the System Controller to determine possible causes.
Booth Operator Instructions: **When called as the System Controller report that due to storm damage it is unlikely that the 115 kv line from Parr will be available for at least a day and that the 13.8 kv line from Parr hydro is also out.**		
	Crew	Record all tripped relay flags. (Contacts Operators to record tripped relay flags).
Booth Operator Instructions: **When called to record relay flags report that there are no relay flags to reset.**		
	Crew	Locally reset tripped relay flags and lockouts only when directed by the Shift Supervisor.
	BOP	Verify an offsite power source is available to the ESF Bus: • BUS 1DA NORM FEED, potential lights are energized **(NO)** OR • BUS 1DA ALT FEED, potential lights are energized.**(YES)**

Op Test No.: 2011 NRC	Scenario # 1	Event # 4		Page 23 of 49		
Event Description:	115KV offsite power is lost, 1DA is deenergized					

Time	Position	Applicant's Actions or Behavior
	Crew	Verify all of the following conditions exist: • The cause of the power loss has been determined. **(YES, Storm damage in the Parr switch yard)** • Any damage to XSW1DA has been corrected. **(No damage to 1DA)** • The cause of the power loss is corrected, OR it does NOT affect restoration of the bus. **(ALT FEED is available)**
NOTE - Step 16 Each switch may be placed in After-Stop immediately after recording the AS FOUND position.		
	BOP	Record the AS FOUND Main Control Board Train A switch positions, then align the switches to After-Stop. REFER TO Attachment 1A.
	Crew	Locally remove power from the Train A ESF Loading Sequencer (XPN-6020 CB-436).
Booth Operator Instructions: **When called to remove power from the Train A ESF Loading Sequencer wait until the crew transitions to EOP-15.0 and then do so by using Trigger 8**		
When the crew requests that power be removed from Train A ESF Loading Sequencer, proceed to the next event		

Op Test No.: 2011 NRC	Scenario # 1 Event # 5, 6, & 7 Page 24 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior

Booth Instructor: **When directed, insert Trigger 5**		
Indications available: **Reactor trip breakers open, TURB TRIP first out** **Turbine stop valve closed status lights** **XCP-624 pt. 1-4 FW ISOL** **XCP-625 pt. 2-1 FWP A/B/C TRIP**		
	CRS	Direct entry into EOP-1.0, REACTOR TRIP SAFETY INJECTION ACTUATION
IOA	RO	Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.**(YES)**
Booth Operator Instructions: **When called to transfer DRPI to 1FB, do so by using Trigger 9**		
IOA	BOP	Verify Turbine/Generator Trip: a. Verify all Turbine STM Stop VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.**(YES)**
IOA	BOP	Verify both ESF buses are energized. **(NO)**

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	25	of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
IOA	BOP	Perform the following: a) Verify at least one ESF bus is energized: • 7.2 KV BUS 1DA is energized. **(NO)** OR • 7.2 KV BUS 1DB is energized. **(YES)** IF no ESF bus is energized, THEN GO TO EOP-6.0, LOSS OF ALL ESF AC POWER, Step 1. **(NO)** b) Try to restore power to the deenergized bus while continuing with this procedure. REFER TO AOP-304.1, LOSS OF BUS 1DA(1DB) WITH THE DIESEL NOT AVAILABLE. **(YES)**
IOA	RO	Check if SI is actuated: a. Check if either: • SI ACT status light is bright on XCP-6107 1-1. Or • Any red first out SI annunciator is lit on XCP-626 top row. b. Actuate SI using either SI ACTUATION Switch **(NO)**
IOA	Crew	Check if SI is required: a. Check if any of the following conditions exist: • PZR pressure less than 1850 psig. OR • RB pressure GREATER THAN 3.6 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline differential pressure GREATER THAN 97 psig. b. Actuate SI using either SI ACTUATION Switch. **(NO)**
Booth Operator Instructions: **As Control Building Operator, silence HVAC board alarms by using Trigger 10**		
IOA	CRS	GO TO EOP-1.1, REACTOR TRIP RECOVERY, Step 1.

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	26	of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available							

Time	Position	Applicant's Actions or Behavior
	Crew	Determines that a Red Path Exists on Heat Sink
	CRS	Transitions to EOP-15.0, RESPONSE TO LOSS OF SECONDARY HEAT SINK

Booth Operator Instructions:
When called to remove power from the Train A ESF Loading Sequencer wait until the crew transitions to EOP-15.0 and then do so by using Trigger 8

CAUTION

- If total EFW flow is LESS THAN 450 gpm due to operator action, this procedure should NOT be performed, since these actions are NOT appropriate if 450 gpm EFW flow is available.
- If a NON-FAULTED SG is available, feed flow should NOT be reestablished to any FAULTED SG, to prevent thermal shock to SG tubes.

NOTE

Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

Time	Position	Applicant's Actions or Behavior
	Crew	Check if a secondary heat sink is required: a. Verify RCS pressure is GREATER THAN any NON-FAULTED SG pressure. b. Verify RCS Thot is GREATER THAN 350 °F.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 27 of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	RO	Verify power is available to all PZR PORV Block Valves: a. MVG-8000A, RELIEF 445 A ISOL. **(YES)** b. MVG-8000B, RELIEF 444 B ISOL **(NO)** c. MVG-8000C, RELIEF 445 B ISOL. **(YES)**
	RO	Locally close XMC1DA2X 06IM, PRESSURIZER PRESSURE RELIEF ISO VALVE XVG8000B-RC breaker on MCC (IB-463).
Booth Operator Instructions: **If called to locally close XMC1DA2X 06IM, PRESSURIZER PRESSURE RELIEF ISO VALVE XVG8000B-RC breaker wait 3 min and then report that it is already closed. (The reason power is not available to the valve is that 1DA is not powered, not that this breaker is open).**		
	RO	Open the Block Valve for any PZR PORV that has been isolated due to excessive seat leakage: • MVG-8000A, RELIEF 445 A ISOL. **(NO)** • MVG-8000B, RELIEF 444 B ISOL. **(NO)** • MVG-8000C, RELIEF 445 B ISOL. **(NO)**
CAUTION - Steps 4 through 16 If Wide Range level in any two SGs is LESS THAN 15% [25%] OR PZR pressure is GREATER THAN 2335 psig due to loss of secondary heat sink, Steps 17 through 24 should be immediately initiated for bleed and feed cooling.		
	BOP	**Ensure the following valves are closed:** ' • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C).

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	28 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available						

Time	Position	Applicant's Actions or Behavior
		Note – Step 5 If EFW flow control can NOT be reestablished from the Control Room, this procedure should be continued while local operator action is in progress to restore EFW flow.
	Crew	Check Control Room indications for the cause of EFW Failure: 1) Verify no EFW annunciators are lit: • XCP-621 3-5 (EFP SUCT HDR PRESS LO XFER TO SW). • Any alarm on XCP-622 • Any alarm on XCP-623 **(NO)** 2) Verify CST level is GREATER THAN 5 ft. **(YES)** 3) Ensure power is available to both MD EFW Pumps. **(NO)**
		Booth Operator Instructions: **When called to investigate the EFW pumps. Report as the IB operator that the instantaneous overcurrent flag for MDEFW B is dropped on A and B phases. Report that 2030 will not open (even if asked to manually bleed air off the valve)**
	CRS	Refer to AOP-304.1 to restore power to IDA.
	BOP	Energize XSW1DA from the normal power source: **(NOT AVAILABLE)**
	BOP	IF XSW1DA normal power source is NOT available, THEN energize XSW1DA from the alternate power a) Ensure BUS 1DA XFER INIT Switch is in OFF. b) Close BUS 1DA ALT FEED Breaker. c) Verify BUS 1DA potential lights are energized.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7 Page 29 of 49
Event Description:		Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available
Time	Position	Applicant's Actions or Behavior

CAUTION - **Step 5.a.4)**

- EFW valves should NOT be opened to SGs with Wide Range level LESS THAN 15% [25%].
- If Wide Range level in all SGs is LESS THAN 15% [25%], EFW valves should be open to only one SG, until RCS temperatures are decreasing, to limit any failure to one SG.

Time	Position	Applicant's Actions or Behavior
	Crew	Ensure all EFW valves are open: **(Applies caution and only opens to one SG)** • FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556),TD EFP TO SG A(B)(C). **(TD EFW Pump not available)** • MVG-2802A(B), MS LOOP B(C) TO TD EFP. • PVG-2030, STM SPLY TO TD EFP TRN A(B). **(Will not open)**
	Crew	Try to restore any EFW flow.
CRITICAL TASK (1)	Crew	Start the "A" MDEFW pump

Evaluator Note:
The following steps establish Feed and Condensate flow using Steps 8-11

CAUTION - Step 8

Deaerator Storage Tank level should be monitored closely and maintained between 2.5 ft and 10.5 ft on LI-3135, DEAER STOR TK WR LVL FEET, to prevent tripping Condensate and Feedwater Booster Pumps.

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	30	of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	Crew	Ensure one Condensate Pump is running.
	Crew	Ensure two Feedwater Booster Pumps are running.
	Crew	Ensure Main FW Control Valves are closed: • FCV-478, A FCV. • FCV-488, B FCV. • FCV-498, C FCV.
	Crew	Place all Main FW Bypass Valve Controllers in MAN and closed: • FCV-3321,LOOP A MAIN FW BYP. • FCV-3331,LOOP B MAIN FW BYP. • FCV-3341,LOOP C MAIN FW BYP.
	Crew	Locally place the following key switches in BYPASS (CB-448): • XVG01611A,B,C (XPN 7114). • IFV03321,3331,3341 TRAIN A (XPN 7115). • IFV03321,3331,3341 TRAIN B (XPN 7121).
Booth Operator Instructions: **When called to place the key switches in BYPASS wait 3 minutes and then do so using Trigger 7.**		
	Crew	Verify XCP-612 2-1 is NOT lit (RB PRESS HI-2 STM LINE ISOL).

Op Test No.: 2011 NRC	Scenario # 1 Event # 5, 6, & 7	Page 31 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available	

Time	Position	Applicant's Actions or Behavior

NOTE - Step 8.g

- SG B or C is preferred, so that a steam supply for the TD EFP will be restored as soon as possible.
- Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.

	Crew	Align the MS Isolation Valves to depressurize only one SG: 1) Verify the MS Isolation Valve, PVM-2801A(B)(C), is open for the SG to be depressurized. 2) Ensure the remaining two MS Isolation Valves, PVM-2801A(B)(C), are closed.
	Crew	Place the following switches in AUTO: • PVG-1611A(B)(C), A(B)(C) ISOL. • FCV-3321,3331,3341, FW CNTRL BYP VLVS, Train A Switch. • FCV-3321,3331,3341, MAIN FW BYPASS VLVS, Train B Switch.
	Crew	Reset both SI RESET TRAIN A(B) Switches.

NOTE - Step 10

Main Feed Pumps trip on SI. If an SI occurs, Steps 9 and 10 should be repeated to restart Main Feed Pumps.

	Crew	Verify PERMISV C-9 status lights bright on XCP-6114 1-3.
	Crew	Open MOV-1-5A(B)(C), TURB DRN VLV.

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	32 of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	Crew	Ensure Feedwater Pump to be started is RESET (MCB or DCS (T ICON)).
	Crew	Ensure FP RECIRC FLOW CNTL STN (R ICON) for the pump to be started is full open in AUTOMATIC.
	Crew	Ensure FPT SETPOINT RAMP LIMIT (A ICON) for the pump to be started is set to 3000 RPM PER MINUTE.
	Crew	Raise the FPT SPEED CONTROL (S ICON) OUT until Turbine speed is greater than 200 rpm.
	Crew	Place the FPT SPEED CONTROL in AUTOMATIC.
	Crew	Adjust the SP on the FPT SPEED CONTROL (S ICON) to maintain Feedwater Pump discharge pressure 150 to 200 psi GREATER THAN Main Steam header pressure.
	Crew	Throttle open FCV-3321(3331)(3341), LOOP A(B)(C) MAIN FW BYP, to the unisolated SG.
CRITICAL TASK (alternate 2)	Crew	Adjust feed flow to restore SG level.

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	33 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available						

Time	Position	Applicant's Actions or Behavior
		NOTE - Step 11 Step 11 should NOT be performed as long as the Main Feed Pump is supplying sufficient flow to increase SG level.
		Evaluator Note: **After restoring a supply of water to the SG's either through Step 5 for the MD EFW Pump or Steps 8-11 for a MFP the scenario can be terminated at the discretion of the Lead Examiner.** **Feed and bleed will probably be avoided by prompt EFW or MFW restoration. The following steps will be taken if wide range level falls to 15% WR.**
	CRS	**Go to Step 17.**
		CAUTION - Steps 17 through 24 Steps 17 through 24 must be performed quickly to establish RCS heat removal by RCS bleed and feed, to minimize core uncovery.
	RO	Ensure all RCPs are tripped.
	Crew	Actuate SI using either SI ACTUATION Switch.
		NOTE - Step 19 Although only one train of SI flow is required to establish an effective RCS feed path, SI flow should be maximized by operating both Charging Pumps if possible.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 34 of 49				

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	RO	Verify an RCS feed path: a. Ensure at least one Charging Pump is running. **(B)** b. Ensure all the following are open: • MVG-8801A(B), HI HEAD TO COLD LEG INJ. • LCV-115B(D), RWST TO CHG PP SUCT. c. Verify COLD/HOT LEG RECIRC monitor lights are dim on XCP-6104. d. Verify SI flow on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM.
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset Containment Isolation: • RESET PHASE A - TRAIN A(B) CNTMT ISOL. • RESET PHASE B - TRAIN A(B) CNTMT ISOL.
	BOP	Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS. b. AUTO-START BLOCKS.
	RO	Establish Instrument Air to the RB a. Start one Instrument Air Compressor and place the other in Standby. b. Open PVA-2659, INST AIR TO RB AIR SERV. c. Open PVT-2660, AIR SPLY TO RB.

NOTE - Step 24

- Establishing a continuous RCS bleed and feed as a means of providing a heat sink results in a breach of the RCS.
- Conditions should be evaluated for reclassifying the event using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 35 of 49				
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available						

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK (backup)	RO	Establish an RCS bleed path: a. Open all PZR PORV Block Valves, MVG-8000A(B)(C). . b. Open all PZR PORVs: • PCV-445A, PWR RELIEF • PCV-445B, PWR RELIEF • PCV-444B, PWR RELIEF
CAUTION - Step 25 If RB pressure increases to GREATER THAN 12 psig, RB Spray should be verified per EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, Step 8, to prevent loss of containment integrity.		
	BOP	Perform Steps 1 through 8 of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, while continuing with this procedure.
Evaluator Note: **Steps 1 through 8 of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION which includes Attachment 3 are found at the end of this scenario.**		
	Crew	Maintain RCS heat removal: • Maintain SI flow. • Maintain at least two PZR PORVs open.
CAUTION - Step 27 If RWST level decreases to LESS THAN 18%, the SI System should be aligned for Cold Leg Recirculation using EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION, to maintain an SI flowpath.		

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	36 of 49

Event Description: Inadvertent FW Isolation Signal, Train B, “B” MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
*	Crew	Check if RB Spray should be stopped: a. Check if any RB Spray Pumps are running. b. Verify RB pressure is LESS THAN 11 psig. c. Depress both RESET TRAIN A(B) RB SPRAY.

NOTE - Step 27.d

- RB Spray must run for a minimum of two hours.
- Anytime RB Spray Pumps are stopped, MVG-3003A(B), SPRAY HDR ISOL LOOP A(B), should be closed for containment isolation.

Time	Position	Applicant's Actions or Behavior
	Crew	Consult with TSC personnel concerning RB Spray System operation.

Booth Operator Instructions:
When called as TSC recommend that RB spray be left running.

CAUTION - Step 28

RHR Pumps should NOT be run longer than 90 minutes without CCW flow to the RHR Heat Exchangers, to prevent RHR Pump damage.

NOTE - Step 28

- If RCS Thot is stable OR decreasing, feed flow should be established slowly to only one SG until Wide Range level indication increases.
- Feed flow should be established slowly to prevent excessive RCS cooldown.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 37 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available		

Time	Position	Applicant's Actions or Behavior
	Crew	Continue to try to establish a secondary heat sink in at least one SG • REFER TO Step 5 for EFW flow. OR • REFER TO Steps 8 through 11 for Feed and Condensate flow. OR • Consult with TSC personnel to try to establish any available low pressure water source

Booth Operator Instructions:
If called as TSC as far as setting up a low pressure water source reply that you will work on a solution.

Evaluator Note:
The flowing steps return EFW to service using Step 5. Establishing Feed and Condensate flow using Steps 8-11 follow that.

Note – Step 5

If EFW flow control can NOT be reestablished from the Control Room, this procedure should be continued while local operator action is in progress to restore EFW flow.

Time	Position	Applicant's Actions or Behavior
	Crew	Check Control Room indications for the cause of EFW Failure: 4) Verify no EFW annunciators are lit: • XCP-621 3-5 (EFP SUCT HDR PRESS LO XFER TO SW). • Any alarm on XCP-622 • Any alarm on XCP-623 **(NO)** 5) Verify CST level is GREATER THAN 5 ft. **(YES)** 6) Ensure power is available to both MD EFW Pumps. **(NO)**

Booth Operator Instructions:
When called to investigate the EFW pumps. Report as the IB operator that the overcurrent for MDEFW B is indicated. Report that 2030 will not open (even if asked to manually bleed air off the valve)

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	38	of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	CRS	Refer to AOP-304.1 to restore power to IDA.
	BOP	Energize XSW1DA from the normal power source: **(NOT AVAILABLE)**
	BOP	IF XSW1DA normal power source is NOT available, THEN energize XSW1DA from the alternate power d) Ensure BUS 1DA XFER INIT Switch is in OFF. e) Close BUS 1DA ALT FEED Breaker. f) Verify BUS 1DA potential lights are energized.

CAUTION - **Step 5.a.4)**

- EFW valves should NOT be opened to SGs with Wide Range level LESS THAN 15% [25%].
- If Wide Range level in all SGs is LESS THAN 15% [25%], EFW valves should be open to only one SG, until RCS temperatures are decreasing, to limit any failure to one SG.

	Crew	Ensure all EFW valves are open: **(Applies caution and only opens to one SG)** • FCV-3531(3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556),TD EFP TO SG A(B)(C). **(TD EFW Pump not available)** • MVG-2802A(B), MS LOOP B(C) TO TD EFP. • PVG-2030, STM SPLY TO TD EFP TRN A(B). **(Will not open)**
	Crew	Try to restore any EFW flow.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 39 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available		

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	Crew	Start the "A" MDEFW pump
Evaluator Note: **The flowing steps establishing Feed and Condensate flow using Steps 8-11**		
CAUTION - Step 8 Deaerator Storage Tank level should be monitored closely and maintained between 2.5 ft and 10.5 ft on LI-3135, DEAER STOR TK WR LVL FEET, to prevent tripping Condensate and Feedwater Booster Pumps.		
	Crew	Ensure one Condensate Pump is running.
	Crew	Ensure two Feedwater Booster Pumps are running.
	Crew	Ensure Main FW Control Valves are closed: • FCV-478, A FCV. • FCV-488, B FCV. • FCV-498, C FCV.
	Crew	Place all Main FW Bypass Valve Controllers in MAN and closed: • FCV-3321,LOOP A MAIN FW BYP. • FCV-3331,LOOP B MAIN FW BYP. • FCV-3341,LOOP C MAIN FW BYP.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 40 of 49				

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	Crew	Locally place the following key switches in BYPASS (CB-448): • XVG01611A,B,C (XPN 7114). • IFV03321,3331,3341 TRAIN A (XPN 7115). • IFV03321,3331,3341 TRAIN B (XPN 7121).

Booth Operator Instructions:
When called to place the key switches in BYPASS wait 3 minutes and then do so using Trigger 7.

Time	Position	Applicant's Actions or Behavior
	Crew	Verify XCP-612 2-1 is NOT lit (RB PRESS HI-2 STM LINE ISOL).

NOTE - Step 8.g

- SG B or C is preferred, so that a steam supply for the TD EFP will be restored as soon as possible.
- Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.

Time	Position	Applicant's Actions or Behavior
	Crew	Align the MS Isolation Valves to depressurize only one SG: 3) Verify the MS Isolation Valve, PVM-2801A(B)(C), is open for the SG to be depressurized. 4) Ensure the remaining two MS Isolation Valves, PVM-2801A(B)(C), are closed.
	Crew	Place the following switches in AUTO: • PVG-1611A(B)(C), A(B)(C) ISOL. • FCV-3321,3331,3341, FW CNTRL BYP VLVS, Train A Switch. • FCV-3321,3331,3341, MAIN FW BYPASS VLVS, Train B Switch.
	Crew	Reset both SI RESET TRAIN A(B) Switches.

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	41 of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior

NOTE - Step 10

Main Feed Pumps trip on SI. If an SI occurs, Steps 9 and 10 should be repeated to restart Main Feed Pumps.

Time	Position	Applicant's Actions or Behavior
	Crew	Verify PERMISV C-9 status lights bright on XCP-6114 1-3.
	Crew	Open MOV-1-5A(B)(C), TURB DRN VLV.
	Crew	Ensure Feedwater Pump to be started is RESET (MCB or DCS (T ICON)).
	Crew	Ensure FP RECIRC FLOW CNTL STN (R ICON) for the pump to be started is full open in AUTOMATIC.
	Crew	Ensure FPT SETPOINT RAMP LIMIT (A ICON) for the pump to be started is set to 3000 RPM PER MINUTE.
	Crew	Raise the FPT SPEED CONTROL (S ICON) OUT until Turbine speed is greater than 200 rpm.
	Crew	Place the FPT SPEED CONTROL in AUTOMATIC.
	Crew	Adjust the SP on the FPT SPEED CONTROL (S ICON) to maintain Feedwater Pump discharge pressure 150 to 200 psi GREATER THAN Main Steam header pressure.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 42 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available		

Time	Position	Applicant's Actions or Behavior
	Crew	Throttle open FCV-3321(3331)(3341), LOOP A(B)(C) MAIN FW BYP, to the unisolated SG.
CRITICAL TASK	Crew	Adjust feed flow to restore SG level.

NOTE - Step 11

Step 11 should NOT be performed as long as the Main Feed Pump is supplying sufficient flow to increase SG level.

Evaluator Note:
After restoring a supply of water to the SG's either through Step 5 for the MD EFW Pump or Steps 8-11 for a MFP the scenario can be terminated at the discretion of the Lead Examiner. The following steps are to reduce SI flow

	Crew	Verify RCS temperatures are decreasing.
	Crew	Verify the SG being used as a secondary heat sink is INTACT: a. Place SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL, in AUTO. b. Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker. c. Radiation level is normal on RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR. d. No SG pressure is decreasing in an uncontrolled manner. e. No SG is completely depressurized.

Op Test No.: 2011 NRC	Scenario # 1	Event # 5, 6, & 7	Page 43 of 49
Event Description:	Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available		

Time	Position	Applicant's Actions or Behavior
		Booth Operator Instructions: **When asked to sample the secondary sides of the SG's as Chemistry wait 30 minutes and then report that all activities are normal.**
		NOTE - Step 31 This procedure should NOT be continued prior to establishing SG Narrow Range level.
	Crew	Verify Narrow Range level is GREATER THAN 30% [50%] in the SG being used as a heat sink
	Crew	Check RCS temperatures: • Verify core exit TC temperatures are decreasing • Verify RCS Thot is decreasing
	Crew	Ensure any Reactor Vessel Head Vent Valves opened in Step 24 are closed.
	Crew	Check if SI can be terminated: a. Verify RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 80°F. b. Verify RVLIS Narrow Range level is GREATER THAN 61% c. GO TO STEP 36
		NOTE - Step 35 It is preferred to meet the termination criteria with at least one PORV open.

Op Test No.:	2011 NRC	Scenario #	1	Event #	5, 6, & 7	Page	44	of 49

Event Description: Inadvertent FW Isolation Signal, Train B, "B" MDEFW pump fails to start, FCV-2030 fails as is; TDEFW Pump fails to start, no EFW available

Time	Position	Applicant's Actions or Behavior
	Crew	Check PZR POR Status: a. Check if any PZR PORV and its associated Block Valve is open. b. Close one PZR PORV and place in AUTO. c. Wait for RCS subcooling to increase to GREATER THAN 80°F or to stabilize. d. RETURN TO Step 34.
Evaluator Note: **Crew will check for SI termination criteria while closing one PORV at a time in the loop created in the proceeding steps.**		
	Crew	Stop all but one Charging Pump.
	Crew	If an PZR PORV's are open, ensure that only one is left open.
	Crew	Establish Normal Charging: a. Close FCV-122, CHG FLOW. b. Open both MVG-8107 and MVG-8108, CHG LINE ISOL. c. Adjust FCV-122, CHG FLOW, to obtain 60 gpm Charging flow. d. Close all PZR PORVs and place ' d. IF any PZR PORV can NOT be in AUTO. e. Close both MVG-8801A(B), HI HEAD TO COLD LEG INJ.
After restoring a supply of water to the SG's either through Step 5 for the MD EFW Pump or Steps 8-11 for a MFP the scenario can be terminated at the discretion of the Lead Examiner.		

Op Test No.: 2011 NRC	Scenario # 1	Event # EOP-1.0	Page 45 of 49
Event Description:	EOP-1.0 Steps 1-8 including Attachment 3		

Time	Position	Applicant's Actions or Behavior

EOP-1.0 STEPS 1-8 INCLUDING
ATTACHMENT 3 - SI EQUIPMENT VERIFICATIONS

Time	Position	Applicant's Actions or Behavior
	BOP	Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing
	BOP	Verify Turbine/Generator Trip: a. Verify all Turbine STM Stop VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.
	BOP	Verify both ESF buses are energized.
	BOP	Check if SI is actuated: a. Check if either: • SI ACT status light is bright on XCP-6107 1-1. OR • Any red first-out SI annunciator is lit on XCP-626 top row. ' b. Actuate SI using either SI ACTUATION Switch. ' c. GO TO Step 6.
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
	BOP	Ensure EFW Pumps are running: a. Ensure both MD EFW pumps are running. b. Verify the TD EFW Pump is running if necessary to maintain SG levels. **(NO EFW Pumps are running)**

Op Test No.: 2011 NRC	Scenario # 1	Event # EOP-1.0	Page 46 of 49
Event Description:	EOP-1.0 Steps 1-8 including Attachment 3		

Time	Position	Applicant's Actions or Behavior
		Start the TD EFW Pump: 1) Ensure at least one of the' following is open: • MVG-2802A, MS LOOP B TO TDEFP. OR • MVG-2802B, MS LOOP C TO TDEFP. **(Both are open)** 2) Open PVG-2030, STM SPLY TO TD EFP TRN A(B). **(Will not open from MCB or locally).**
	BOP	Ensure the following EFW valves are open: • FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556), TD EFP TO SG A(B)(C) • MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm. **(NO)**
	BOP	IF Narrow Range level is GREATER THAN 26% [40%] in any SG, THEN control EFW flow to maintain Narrow Range SG level. IF Narrow Range level is LESS THAN 26% [40%] in all SGs, THEN start pumps and align valves as necessary to obtain GREATER THAN 450 gpm total EFW flow. **(EOP-15.0 is trying this)**
	BOP	Ensure FW Isolation: a. Ensure the following are closed: • FW Flow Control • FW Isolation, PVG-1611A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341). • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C). b. Ensure all Main FW Pumps are tripped

Op Test No.: 2011 NRC Scenario # 1 Event # EOP-1.0 Page 47 of 49

Event Description: EOP-1.0 Steps 1-8 including Attachment 3

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure SI Pumps are running: • Two Charging Pumps are running. • Both RHR Pumps are running. **(ONLY B pumps are running)**
	BOP	Ensure two RBCU Fans are running in slow speed (one per train) **(ONLY B train is working)**
	BOP	Verify Service Water to the RBCUs: a. Ensure two Service Water Pumps are running. b. Ensure both Service Water Booster Pumps A(B) are running. b. Verify GREATER THAN 2000 gpm flow for each train on: a. FI-4466 , SWBP A DISCH FLOW GPM. b. FI-4496, SWBP B DISCH FLOW GPM. **(Only B Train)**
	BOP	Verify two CCW Pumps are running. **(Only B Train)**
	BOP	Ensure two Chilled Water Pumps and Chillers are running. **(Only B Train)**
	BOP	Check if Main Steamlines should be isolated: a. Check if any of the following conditions are met: • RB pressure GREATER THAN 6.35 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F. b. Ensure ALL the following are closed: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Ensure Excess Letdown Isolation Valves are closed: • PVT-8153, XS LTDN ISOL. • PVT-8154, XS LTDN ISOL.

Op Test No.: 2011 NRC	Scenario # 1	Event # EOP-1.0		Page 48 of 49	
Event Description:	EOP-1.0 Steps 1-8 including Attachment 3				

Time	Position	Applicant's Actions or Behavior
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
	BOP	Verify proper SI alignment: a. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. b. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. c. Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM. d. Check if RCS pressure is LESS THAN 250 psig. e. Verify RHR flow on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM AND • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.
	BOP	Verify proper SI alignment: f. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. g. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. h. Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM. i. Check if RCS pressure is LESS THAN 250 psig. j. Verify RHR flow on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM AND • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.
	BOP	Announce plant conditions over the page system.
*	BOP	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen. **(NO)**

Op Test No.:	2011 NRC	Scenario #	1	Event #	EOP-1.0	Page	49	of	49
Event Description:	EOP-1.0 Steps 1-8 including Attachment 3								

Time	Position	Applicant's Actions or Behavior
	BOP	Perform the following: **(ONLY B Train Spray will work)** a) Verify both the following annunciators are lit: • XCP-612 3-2 (RB SPR ACT). • XCP-612 4-2 (PHASE B ISOL). IF either annunciator is NOT' lit, THEN actuate RB Spray by placing the following switches' to ACTUATE: • Both CS-SGA1 and CS-SGA2. OR • Both CS-SGB1 and CS-SGB2. b) Verify Phase B Isolation by ensuring RB SPRAY/PHASE B ISOL monitor lights are bright on XCP-6105. c) Ensure the following are open: • MVG-3001A(B), RWST TO SPRAY PUMP A(B) SUCT. • MVG-3002A(B), NAOH TO SPRAY PUMP A(B) SUCT. • MVG-3003A(B), SPRAY HDR ISOL LOOP A(B). d) Ensure both RB Spray Pumps are running. e) Verify RB Spray flow is GREATER THAN 2500 gpm for each operating train on: • FI-7368, SPR PP A DISCH FLOW GPM. • FI-7378, SPR PP B DISCH FLOW GPM. f) Stop all RCPs.

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 100% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2) / / B1 Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	Operations scheduled for oncoming shifts:	
	Plant safeguard systems in degraded status:	
		Initials
	In the Control Room, all books are replaced, the desk and console tops are clear, and all trash is properly disposed of.	
	Station Log completed.	

Oncoming Control Room Supervisor			Initials
Oncoming watch has reviewed the VCS Switchgear mailbox for switching orders.			
Plant Status (to be completed prior to turnover):			
	Plant ESF System Status:		
	Component Cooling System		
	Service water System		
	Reactor Building Cooling System		
	Reactor Building Spray System		
	Accumulator Tanks		
	RHR System		
	Charging/Safety Injection System		
	Emergency Feedwater System		
	Diesel Generator		
	Chilled Water System		
	Control Room Ventilation System		
	Position indications, power availability, and annunciator alarms are normal for present plant conditions.		
	Plant Parameters	Limit	
	Reactor Power	0-100%	
	RCS Tavg	≤589.2°F per loop	
	RCS Pressure	<2385 psig	
	RCS Flow	>100% per loop	
	RCS Subcooling	Normal	
All parameters within allowable limits for plant conditions. If not, what actions are being taken to correct conditions:			
	Review of Logs:		
	Station Log		
	Removal and Restoration Log		
	Tagout Log		
	Special Orders		
Shift Turnover (to be completed during turnover):			
	Briefing on plant conditions by offgoing Control Room Supervisor.		
	Review of SPDS and BISI displays.		
	Identification of in-progress procedures including their present status and locations.		

CHG C

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Control Room Supervisor	
	Offgoing Control Room Supervisor	
	Shift Supervisor review	

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 100% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2) // B1 Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours. Supplemental equipment walkdown due in 3 hours

Offgoing Reactor Operator	Initials
Main Control Board (Reactor Operator portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Reactor Operator area of responsibility.	

Oncoming Reactor Operator	Initials
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	

System Alignment	A	B	C	Train aligned to	Reasons for any inoperable equipment
Service Water Pumps	X	X		A	
Component Cooling Pumps	X			A	
Charging Pumps	X			A	
HVAC Chillers	X			A	
Reactor Building Spray Pumps					
RHR Pumps					
			TDEFP		
Emergency Feedwater Pumps					
Inoperable Radiation Monitors					

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Reactor Operator	
	Offgoing Reactor Operator	
	Shift Supervisor review	

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 100% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x2) / / B1 Maintenance Week // A Train
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3
hours

Offgoing Balance Of Plant	Initials
Main Control Board (Balance Of Plant portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Balance Of Plant area of responsibility.	

Oncoming Balance Of Plant	Initials
Review of Main Control Room Panels.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Test annunciator lights (with Offgoing operator concurrence).	

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Balance Of Plant	
	Offgoing Balance Of Plant	
	Shift Supervisor review	

Facility:	VC SUMMER	Scenario No.:2	Op Test No.: 2011 NRC
Examiners:	____________	Operators:	CRS
	____________		RO
	____________		BOP

Initial Conditions:	• IC-39, 2% Power, BOL GOP-4A, Step 3.5.c and SOP-214 step 2.10.a
	• "B" EDG is OOS to clean the lube oil strainer
	• "B" RB spray pump is out of service for bearing replacement
	• National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area
Turnover:	• Complete chest warmup of turbine: manually position MSV2 for 100# to 200# steam • Remain in MODE 2 until EDG is OPERABLE • Dilute 100 gallons to adjust rod position per RX Engineering plan • Condensate polishing is in service
Critical Tasks:	• Isolate EFW to the faulted SG before transiting out of EOP-3.
	• Restore "A" RB Spray flowpath or cooling to "B" train RB Cooling Unit prior to completion of Attachment 3

Event No.	Malf. No.	Event Type*	Event Description
1.		R-RO	Dilutes 100 gallons
2.		N–BOP,CRS	Warm Main Turbine
3.	NIS008A	TS-CRS	Intermediate range channel NI35 and Source Range NI31 fail low
4.	ANN-TS001	C–CRS, BOP	Main Transformer high side OCB gas pressure 75 psig, crew should transfer BOP busses to Emerg Aux transformers and open the OCB BOP2
5.	MSS012	C-BOP, CRS	Condenser steam dumps drift closed due to PT464 failure BOP1
6.	AUX 14A&B	C-RO, CRS	Loss of Instrument Air RO1
7.	CVC004A	C – RO, CRS TS- CRS	Progressive failure of RCP "A" #1 seal towards 100 gpm over a 15 minute ramp RO2
8.	N/A	N–BOP,CRS	Shutdown plant to MODE 3 due to only 2 RCPs in service
9.	MSS003C	M–ALL	DBA Main Steamline Break inside Reactor Building "C" SG
10.	PCS006A	C– BOP, CRS	Failure of Train A Phase A signal prevents spray from "A" train
11.	PMP-SW006F	C– RO, CRS	"B" SWBP fails to autostart
			Terminate set after SI flow terminated, RCS temperature controlled, and RB cooling restored

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

DRAFT

VC Summer NRC Scenario #2

The crew will assume the watch having pre-briefed on the Initial Conditions (stable in MODE 2, rods in MANUAL, on Emergency Feedwater) The plan for this shift is to warm the Main Turbine per SOP-214 and GOP-4A.

The Reactor Operator will dilute 100 gallons as recommended by Reactor Engineering.

Turbine chest Warming is conducted per SOP-214. This exercises reactor power control with MANUAL rod control as heat load varies.

When Makeup Control is Back in AUTO, the Lead Evaluator can cue Intermediate Range channel N35 failing low (this loss of high voltage also removes indication from source range GammaMetrics channel N31). The CRS will evaluate Technical Specifications 3.3.1 and 3.3.3.6.

Annunciator XCP-638, MN XFMR OCB 8902 TROUBLE will indicate dropping SF_6 pressure in the Main Transformer High Side breaker. The System Controller will direct opening the breaker, which requires transfer of the Balance of Plant busses to the Emergency Aux transformer.

After the BOP busses have been transferred to alternate power, the Lead Evaluator can cue the failure of the main steam header pressure transmitter drifting low, which will cause the steam dumps to drift closed in AUTO. Operators will restore temperature control by either controlling the steam dumps in MANUAL or turning the steam dumps off and controlling the SG PORVs.

The running Instrument Air compressor trips with a failure of the Standby compressor to autostart. The RO can manually start the supplemental IA compressor from the main control board.

Reactor Coolant Pump "A" #1 seal fails, ramp to 100 gpm. Crew will stop the "A" RCP and isolate #1 seal leakoff per AOP-101.2 REACTOR COOLANT PUMP SEAL FAILURE. This will complicate pressure control later since the "A" loop provides the most effective Pressurizer spray. The crew will shutdown the plant due to having only 2 Reactor Coolant loops in operation.

A Design Basis Main Steamline Break will occur on the "C" loop, requiring transition to EOP-3.0 FAULTED STEAM GENERATOR ISOLATION and possibly EOP-16.0 RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK. Failure of the available RB spray pump and one Service Water Booster Pump (RB Cooling Unit supply) will require operator actions to limit Reactor Building pressure increases.

VCS 2011 NRC Scenario 2 Simulator Setup (SNAP 302)

Initial Conditions:

- IC-39, 2% power, BOL GOP-4A step 3.5
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires).
- Conduct two-minute drill
- Mark up procedures in use with "Circle and slash" as applicable

Pre-Exercise:

Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.)

TQP-801 Booth Operator checklist, has been completed

Hang red tags for equipment out of service

PRE-LOAD

- LOA AUX 118 = RACK OUT "B" RB Spray pump breaker
- Malfunction PCS006A = FAILURE TO INIT "A" train Containment Phase A
- PMP SW006F "B" SWBP fails to autostart
- LOA-EPS114 = MAINTENANCE ("B" EDG OOS)
- PMP-IA002F IA compressor B fails to auto start

EVENT 1: Dilute the RCS

- No simulator manipulations required
- Crew will dilute 100 gallons

EVENT 2: Warm the main turbine

- No simulator manipulations required

EVENT 3: Loss of N36 Intermediate range Instrument

- Trigger 3, Insert Malfunction NIS002B
- Repairs will not be made during scenario, I&C troubleshooting

EVENT 4: SF_6 leak on Main Transformer High Side Breaker 8902

- Override ANN TS001 = ON
- Prompt as System Controller to open breaker
- This will require the crew to transfer the Balance of Plant busses to the Emergency Auxiliary transformers

EVENT 5: Steam dumps fail closed

- Trigger 5 Malfunction MSS012 = 0 psig 2 minute ramp

EVENT 6 Loss of Instrument Air

- Trigger 6 Malfunctions AUX 14 A&B Trip of Instrument Air Compressors
- Trigger 14, LOA AUX-110, 2 minute time delay, starts the Diesel air compressor

EVENT 7: Reactor Coolant Pump "A" #1 seal failure

- Trigger 7, Malfunction CVC004A=100 gpm, 15 minute ramp
- Crew will call for installation of fuse for leakoff isolation valve 8141A (insert and remove malfunction VLV CS052W)
- Trigger 11, LOA-CVC038, V 8369A - SEAL INJECTION THROTTLE VALVE

EVENT 8: Shutdown plant to MODE 3

- No simulator manipulations required
- Crew must shutdown in one hour due to Technical Specifications

EVENT 9: Large steamline break inside the Reactor Building

- Trigger 9, Insert malfunction MSS003C = 12E6 over a 6 minute ramp
- Crew may attempt local opening of MVG-3003A, VLV-SP005P = 100% 1 minute ramp

Local action to replace fuse 75 for PVT-8141A

- Insert and remove malfunction VLV-CS052W *or* use "install Fuses PVT-8141A" button on the LOA/RESET panel

Local action to throttle seal injection

- Insert trigger 10 LOA-CVC038, adjust as requested

Local action to gag closed SW to CCW surge tank (not expected due to air bottles at valves)

- Insert trigger 12 VLV-CC018P & CC019P = 0% (9627A&B closed)

Local action to open XVG-3003A spray header isolation valve

- Insert trigger 13 VLV-SP005P = 100%, 1 minute ramp, adjust as requested

Local action to start diesel air compressor

- Insert Trigger 14 LOA AUX110 Start Diesel Air Compressor & open PVG-2670

Op Test No.:	2011 NRC	Scenario #	2	Event #	1	Page	6	of 40
Event Description:	Dilute 100 gallons							

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **No action required for event 1**		
Evaluator Note: **This event could also occur during events 2 or 3.**		
	RO	Verifies sufficient volume exists in the Recycle Holdup Tanks to receive Reactor Coolant displaced during planned dilution operation.
NOTE 2.0 1. Energizing additional Pressurizer Heaters will enhance mixing. 2. LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.		
	RO	Verify at least one Reactor Coolant Pump is running.
	RO	Place RX COOL SYS MU switch to STOP.
	RO	Place RX COOL SYS MU MODE SELECT switch to ALT DIL. **(Peer ✓)**
	RO	Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate.
	RO	Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. **(Peer ✓)**
	RO	Place RX COOL SYS MU switch to START.

Op Test No.: 2011 NRC	Scenario # 2	Event # 1	Page 7 of 40	
Event Description:	Dilute 100 gallons			

Time	Position	Applicant's Actions or Behavior
	RO	Verify desired flow rate on FR-113, TOTAL MU GPM (F-168).
	RO	Verify alternate dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator.
	RO	Place RX COOL SYS MU switch to STOP.
	RO	Place RX COOL SYS MU MODE SELECT switch to AUTO. **(Peer ✓)**
	RO	Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 turns (120 gpm).
	RO	Place RX COOL SYS MU switch to START.
When reactor makeup is returned to automatic control, proceed to the next event.		

Op Test No.: 2011 NRC	Scenario # 2	Event # 2	Page 8 of 40
Event Description:	Warm the main turbine control valve chest		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **No action required for event 2**		
Indications available: **None Applicable**		
	BOP	Ensure MSV2 Position indicates a negative % value.
	BOP	Select ON on Chest Warming, (a dialog box opens).
	BOP	Select OK. 1) Verify the following: a) MSVs 1, 3, and 4 indicate 0%. b) MSV 2 remains at the indicated negative value. c) CVs 1- 4 indicate 0% d) IVs 1 – 4 indicate 0% e) ISVs 1 – 4 go to 100%.
	BOP	Close MVG-2897, COMB CNTRL VLV BSD
	BOP	e. Slowly open MSV2 on the Control/Pre-warming screen, while maintaining differential temperature between CV Chest Inner and CV Chest Outer less than 150°F by one of the following methods:
Booth operator instructions; if contacted as Shift Supervisor, direct positioning MSV2 manually for 100 to 200 psig chest pressure		

Op Test No.:	2011 NRC	Scenario #	2	Event #	2	Page 9 of	40
Event Description:	Warm the main turbine control valve chest						

Time	Position	Applicant's Actions or Behavior
	BOP	2) Position MSV2 manually if desired by: a) Select Ramp Rate (a dialog box opens). b) Enter 0.5, select OK. c) Confirm setpoint change, select OK. d) Select Raise Momentarily until desired pressure is reached. e) Use the Lower pushbutton as necessary to control pressure.

Lead Examiner may direct initiation of the next event at his discretion

Op Test No.: 2011 NRC	Scenario # 2	Event # 3	Page 10 of 40
Event Description:	Intermediate channel N35 and source range N31 fail low		

Time	Position	Applicant's Actions or Behavior
		Booth Operator Instructions: **When directed insert malfunction for Event 3 (Trigger 3)**
		Indications available: **XCP-620 4-1 SR/IR DETECTOR TROUBLE II**
	Crew	Refer to alarm response procedure ARP-001-XCP-620 4-1
		PROBABLE CAUSE: 1. Loss of Instrument power or blown Instrument power fuse. 2. Intermediate Range channel N36 S-3 test switch in test (located inside Intermediate Range drawer).
		AUTOMATIC ACTIONS: 1. None.
		CORRECTIVE ACTIONS:
	CRS	Refer to AOP-401.8, Intermediate Range Channel Failure, or to AOP-401.9, Source Range Channel Failure
		NOTE Startup is not allowed with less than 2 Source Range channels operable.
		SUPPLEMENTAL ACTIONS:
	CRS	Refer to Technical Specification Table 3.3-1 for instrumentation requirements.

Op Test No.: 2011 NRC	Scenario # 2	Event # 3	Page 11 of 40				
Event Description:	Intermediate channel N35 and source range N31 fail low						

Time	Position	Applicant's Actions or Behavior
	CRS	Enters AOP-401.8, Intermediate Range Channel Failure
	RO	Stabilize reactor power at the current level
	RO	Bypass the failed Intermediate Range level channel • Place LEVEL TRIP switch for affected channel in BYPASS • Verify IR&SR TRIP BYP (XCP-620, 4-5) is LIT
	RO	Check if reactor power is less than $7.5X10^{-6\%}$ **(NO)**
	RO	Within 1 hour, verify P-6 is BRIGHT
	RO	Maintain reactor power less than 5%
	RO	Monitor the operable Intermediate Range channel
	RO	Ensure NR-45 is selected to the operable channels **(NO)**
	CRS	Refer to Technical Specifications • TS 3.3.1 action 3 for Functional Unit 5
	CRS	Enters AOP-401.9, SOURCE RANGE CHANNEL FAILURE
IOA	CRS	Stop all core alterations **(N/A)**.

Op Test No.:	2011 NRC	Scenario #	2	Event #	3	Page	12 of 40
Event Description:	Intermediate channel N35 and source range N31 fail low						

Time	Position	Applicant's Actions or Behavior
IOA	CRS/RO	Stop all positive reactivity additions.
	RO	Verify NI-31 OR NI-32 is operable **(N32 is)**.
	RO	Check if the Reactor Building evacuation alarm has actuated: **(NO)** GO TO Step 6.
	RO	Bypass the failed Source Range channel: a. Place LEVEL TRIP Switch for the AFFECTED channel in BYPASS. b. Verify IR&SR TRIP BYP (XCP-620 4-5), annunciator is lit.
	RO	Block Source Range High Flux At Shutdown: a. Place HIGH FLUX AT SHUTDOWN Switch for the AFFECTED channel in BLOCK. b. Verify SR HIGH FLUX AT SHUTDN BLOCK (XCP-620 4-4),
	RO	Monitor an operable NI channel **(N32)**.
	RO	Ensure NR-45 is selected to the appropriate operable channels.

Op Test No.:	2011 NRC	Scenario #	2	Event #	3	Page	13 of 40
Event Description:	Intermediate channel N35 and source range N31 fail low						

Time	Position	Applicant's Actions or Behavior
	CRS	Determines from TS table 3.3-1 that item 5. Requires action 3 and entry into MODE 1 is not permitted (MODE change with LCO not met).
		ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement and with the THERMAL POWER level: a. Below the P-6 (Intermediate Range Neutron Flux Interlock) setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint.**(N/A)** b. Above the P-6 (Intermediate Range Neutron Flux Interlock) setpoint but below 10 percent of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10 percent of RATED THERMAL POWER. **(YES)**

On Lead Examiners cue, proceed to the next event.

Op Test No.: 2011 NRC	Scenario # 2 Event # 4	Page 14 of 40
Event Description:	High side OCB losses SF_6 pressure	

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, initiate Event 4 (Trigger 4)**		
Indications available: **XCP-638 1-1, MN XFMR OCB 8902 TROUBLE**		
	Crew	Refer to alarm response procedure ARP-001-XCP-638 1-1
		PROBABLE CAUSE: 1. Spring charge pump failure. 2. SF6 gas leak. 3. Blown rupture disc.
NOTE 1. Breaker closure is disabled upon either of the following conditions: a. Spring charge is less than 32.5 mm. b. SF6 gas pressure is less than 74 psig at 68°F. 2. Breaker trip is disabled by SF6 gas pressure less than 72 psig at 68°F. 3. If SF6 gas pressure is reduced to less than 74 psig, Switchyard personnel must reset the local SF6 Lockout Relay to re-enable breaker closure.		
		AUTOMATIC ACTIONS: 1. None.
		CORRECTIVE ACTIONS:
	Crew	1. Dispatch an operator to verify the following: a. SF_6 gas density is greater than 90%. b. Spring charge indicator is in the ENERGY STORAGE position. c. SF_6 gas pressure compared to SF_6 gas temperature is normal per characteristic chart.

Op Test No.:	2011 NRC	Scenario #	2	Event #	4	Page	15 of 40
Event Description:	High side OCB losses SF_6 pressure						

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When called to investigate OCB8902 report. That gas density is 97%, the spring charge indicator is in the ENERGY STORAGE position, and that gas pressure is 75 psig dropping slowly and it is 68 °F outside.**		
		SUPPLEMENTAL ACTIONS:
	BOP	1. Notify the System Controller of problem.
Booth Operator Instructions: **When called as system controller, recommend opening OCB 8902. Give switching order number as 002 and state that email will follow.**		
	BOP	Finds SOP-304, 115KV/7.2KV OPERATIONS, Section IV.A TRANSFERRING BOP BUSES FROM NORMAL TO ALTERNATE FEED
	BOP	Verifies that the AUTO-MAN XFER Switch for each Balance of Plant bus is in AUTO.
	BOP	Verifies that XTF0031 and XTF0032, EMERGENCY AUXILIARY TRANSFORMER #1 and #2, are in service per SOP-302.
	BOP	Determines that conditions exist which require removal of normal feed for the buses.
	BOP	Verifies that XTF0001, MAIN TRANSFORMER, and XTF0002, UNIT AUXILIARY TRANSFORMER, are in service per SOP-302.

Op Test No.: 2011 NRC	Scenario # 2	Event # 4	Page 16 of 40
Event Description:	High side OCB losses SF_6 pressure		

Time	Position	Applicant's Actions or Behavior

NOTE 2.1 through 2.3

a. When BUS 1A, 1B, or 1C is aligned to its alternate feed, automatic transfer to its normal feed is not available.
b. When transferring the bus, there is a delay while the bus synchronizes. Hold the switch in the closed position until the breaker closes.

	BOP	Place BUS 1A AUTO-MAN XFER Switch in MAN.
	BOP	Close BUS 1A ALT FEED breaker. **(PEER ✓)**
	BOP	Open BUS 1A NORM FEED breaker. **(PEER ✓)**
	BOP	Verify BUS 1A potential lights remain lit.
	BOP	Place BUS 1A AUTO-MAN XFER Switch in AUTO. **(PEER ✓)**
	BOP	Place BUS 1B AUTO-MAN XFER Switch in MAN.
	BOP	Close BUS 1B ALT FEED breaker. **(PEER ✓)**
	BOP	Open BUS 1B NORM FEED breaker. **(PEER ✓)**
	BOP	Verify BUS 1B potential lights remain lit.

Op Test No.:	2011 NRC	Scenario #	2	Event #	4	Page	17	of 40
Event Description:	High side OCB losses SF_6 pressure							

Time	Position	Applicant's Actions or Behavior
	BOP	Place BUS 1B AUTO-MAN XFER Switch in AUTO. **(PEER ✓)**
NOTE 2.3.a and 2.3.b When placing XSW1C on alternate feed during time critical situations, Steps 2.3.a and 2.3.b shall be done at the end of the transfer. By skipping these steps the bus may be inoperable due to not meeting voltage requirements or Real Time Contingency Analysis.		
	BOP	Place BUS 1C AUTO-MAN XFER Switch in MAN.
	BOP	Close BUS 1C ALT FEED breaker. **(PEER ✓)**
	BOP	Open BUS 1C NORM FEED breaker. **(PEER ✓)**
	BOP	Verify BUS 1C potential lights remain lit.
	BOP	Place BUS 1C AUTO-MAN XFER Switch in AUTO. **(PEER ✓)**
	BOP	Open OCB 8902
	BOP	Determine bus voltage limits from Enclosure B Lower Limit = 219.0 KV Upper Limit = 239.6 KV
	BOP	Notify the System Controller of the applicable bus voltage limits from Enclosure B.

Op Test No.: 2011 NRC	Scenario # 2	Event # 4	Page 18 of 40
Event Description:	High side OCB losses SF_6 pressure		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When called as System Controller acknowledge bus voltage limits.**		
	BOP	If required, adjust the 115KV and/or 230KV alarm setpoints per Attachment VA and/or Attachment VB for the current lineup.
Evaluator Note: **Cue crew that setpoints will be changed by the control building operator.** **Simulator Setpoint monitor is different than one used in the plant. Setpoint adjustment is not required during transients on the simulator.**		
On Lead Examiner's cue, proceed to the next event		

Op Test No.:	2011 NRC	Scenario #	2	Event #	5	Page	19 of 40
Event Description:	Condenser steam dumps drift closed						

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed insert malfunction for Event 5 (Trigger 5)**		
Indications available: **XCP-615 Pt 1-5 RCS TAVG DEV HI/LO** **OPCRIT alarm for steam dump valves closed**		
	RO	Identifies excessive RCS heatup (temperature rises until SG PORVs lift, approx. 564°F.
	BOP/CRS	Identifies zero output (demand) from steam dump controller. Controller does not respond in AUTO.
	BOP	Opens steam dumps in MANUAL
	BOP	Verifies SG PORVs close if open
On Lead Examiner's cue that temperature is stable, proceed to the next event		

Op Test No.: 2011 NRC	Scenario # 2 Event # 6	Page 20 of 40
Event Description:	Trip of running IA compressor, standby doesn't start	
Time	Position	Applicant's Actions or Behavior

Booth Operator Instructions:
When directed insert Trigger 6

Indication available:
XCP-606 2-1, INSTR AIR CMPR A TRBL
XCP-607 2-5, INSTR AIR PRESS LO FLO HI
XCP-607 2-6, SEVR AIR PRESS LO
XCP-607 2-1, INSTR AIR CMPR B TRBL

	Crew	Refer to Alarm Response Procedure ARP-001-606 2-1
		AUTOMATIC ACTIONS: 1. Instrument Air Compressor A will trip 2. Instrument Air Compressor B will start automatically on low receiver tank pressure at 90 psig and cycle between 105 psig and 115 psig.

NOTE

This alarm has reflash capabilities.

		CORRECTIVE ACTIONS:
	RO	If Instrument Air Compressor A trips, ensure the standby air compressor starts. **(WON'T)**
	RO	Dispatch an operator to Instrument Air Compressor A to determine the cause of the alarm.

Op Test No.: 2011 NRC	Scenario # 2	Event # 6	Page 21 of 40	
Event Description:	Trip of running IA compressor, standby doesn't start			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When sent to the A, B, and Supplemental air compressors report that A tripped on low oil pressure and has a oil leak, B had a starter fault, and that the supplemental air compressor tripped on overcurrent.**		
	CRS	Entry into AOP-220.1, LOSS OF INSTRUMENT AIR
CAUTION If a Reactor Trip or SI Actuation occurs during this procedure, EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, should be performed while continuing with this procedure.		
	RO	Ensure the standby Instrument Air Compressor is running. **(NO)**
	RO	Check if Instrument Air header pressure is increasing. **(NO)**
	RO	Start XAC-12-IA, SUPP INST AIR COMPRESSOR. **(YES)**
	RO	Locally start the Diesel Driven Air Compressor. REFER TO SOP-220,STATION AND BACKUP INSTRUMENT AIR SYSTEMS.
Booth Operator Instructions: **When called to start the diesel driven air compressor, insert trigger 14 and report that it starts.** **(LOA AUX-110 starts the diesel air compressor and connects it to the IA system).**		
At the discretion of the lead examiner proceed to the next event		

Op Test No.: 2011 NRC	Scenario # 2	Event #s 7&8			Page 22 of 40		

Event Description: Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3

Time	Position	Applicant's Actions or Behavior

Booth Instructor:
When directed, initiate Event 7 (Trigger 7)

Indications available:
XCP-603, 1-1, RCP A CCW TEMP HI
XCP-617, 2-1, RCP A #1 SL LKOFF FLO HI/LO
XCP-617, 2-4, RCP A STANDPIPE LVL HI/LO
XCP-618, 2-2, RCP B #1 SL INJ FLO LO
XCP-619, 2-2, RCP C #1 SL INJ FLO LO
Seal leakoff flow on RCP "A" rising to off-scale high

	Crew	Refer to Alarm Response Procedures
	RO	Determines RCP A #1 Seal Leakoff is rising rapidly
	CRS	Direct entry to AOP-101.2, Reactor Coolant Pump Seal Failure

CAUTION

PVT-8141A, A SEAL LKOFF, should be closed between three minutes and five minutes after the affected Reactor Coolant Pump is secured.

Reactor Coolant System Controlled Leakage should be limited to 33 gpm per Technical Specification 3.4.6.2 in Modes 1, 2, 3, and 4.

	CRS	While continuing with this procedure, have an operator install the pre-staged fuses for the AFFECTED RCP's Seal Leakoff Valve in Main Control Board Panel XCP-6109 Subpanel #5: • XVT-8141A-FU-CS75.

Booth Operator Instructions:
Use LOA Resets page to install fuses for PVT-8141A-FU-CS75

Op Test No.: 2011 NRC	Scenario # 2	Event #s 7&8	Page 23 of 40				
Event Description:	Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3						

Time	Position	Applicant's Actions or Behavior
	RO	Ensure seal injection flow is GREATER THAN 8 gpm for the affected Reactor Coolant Pump on FI-130A, RCP A INJ FLO GPM.
	RO	Ensure Component Cooling Water flow to the affected Reactor Coolant Pump thermal barrier is between 35 gpm (50%) and 60 gpm (87.5%) on FM-7138, RCP THERM BAR A (MODUFLASH M2 CC POINTS 19).
	CRS	Check the following conditions for the affected Reactor Coolant Pump on the IPCS: • Bearing water temperature (LOWER SEAL WTR BRG T) on T0417A is LESS THAN 225°F and NOT significantly increasing. AND • #1 seal leakoff temperature (SEAL WTR OUT TEMP) on T0181A is LESS THAN 235°F and NOT significantly increasing (NO). GO TO STEP 6

NOTE - Step 6 -

When PVT-8141A, A SEAL LKOFF, is closed, the #1 seal ΔP indication will be unreliable.

	Crew	Check if Reactor power is GREATER THAN 38% (Reactor Permissive P-8, REACTOR TRIP BLOCKED, is dim). (**NO**)
	RO	Stop the affected Reactor Coolant Pump.

Note:
The BOP may place A Feedwater Regulating Valve in MANUAL to control level swings caused by stopping A RCP.
The NROATC may place the "A" spray valve PCV 444D, PZR SPRAY, in MANUAL and 0% per SOP-101

Op Test No.:	2011 NRC	Scenario #	2	Event #s	7&8	Page	24	of	40

Event Description: Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3

Time	Position	Applicant's Actions or Behavior
	RO/CRS	Perform the following for the affected Reactor Coolant Pump: • Close PVT-8141A, A SEAL LKOFF, between three to five minutes. • Increase seal injection flow to 13 gpm to the affected Reactor Coolant Pump by locally unlocking and throttling one of the following: o XVN08369A-CS, RCP A SEAL SUPPLY THROTTLE VALVE (AB-412 West Pen).

Booth Operator Instructions:
When called to throttle seal supply use trigger 10 LOA-CVC038, V 8369A - SEAL INJECTION THROTTLE VALVE, to do so.

Time	Position	Applicant's Actions or Behavior
	CRS	Within one hour, shut down the plant to hot standby. GO TO the appropriate GOP: GOP-5, REACTOR SHUTDOWN FROM STARTUP TO HOT STANDBY (MODE 2 TO MODE 3).
	CRS	Complete GTP-702 Attachment II.K, Operational Mode Change Plant Shutdown - Entering Mode 3 Or Plant Trip To Mode 3 From Modes 1 Or 2.
	CRS	Perform a Mode Change Brief per OAP-100.4 Attachment I.
	RO	Select both Intermediate Range Channels on NR-45, NIS RECORDER.

NOTE 3.4 through 3.5

Control Rods are inserted using Step 3.4 or Step 3.5. Step 3.4 inserts Control Rods via a Manual Reactor Trip. Step 3.5 manually inserts Control Rods.

Op Test No.: 2011 NRC	Scenario # 2	Event #s 7&8	Page 25 of 40
Event Description:	Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3		

Time	Position	Applicant's Actions or Behavior
		NOTE 3.4 If performing a manual boration prior to manually tripping the Reactor, consider performance of STP-130.004C, EMERGENCY BORATION VALVE OPERABILITY TESTING (MODE 4) during the boration.
	CRS	Perform a Pre-job brief per OAP-100.3, Human Performance Tools.
	RO	Select one Intermediate Range and one Source Range Channel on NR-45, NIS RECORDER.
	BOP	Ensure both Motor Driven Emergency Feedwater Pumps are running.
	RO	(Optional) If desired, commence RCS boration prior to performing a manual Reactor trip: 1) Open MVT-8104, EMERG BORATE. 2) Ensure XPP-13A(B), BA XFER PP A(B),is running.
		NOTE 3.4.d.3) The expectation is to trip the Reactor following verification of greater than 30 gpm flow on FI-110, EMERG BORATE FLOW GPM. Subsequent steps, 3.4.d.4) through 6) may be performed after verification of Reactor trip.
	RO	Verify greater than 30 gpm flow on FI-110, EMERG BORATE FLOW GPM.

Op Test No.:	2011 NRC	Scenario #	2	Event #s	7&8	Page	26 of 40
Event Description:	Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3						

Time	Position	Applicant's Actions or Behavior
		NOTE 3.4.d.4) Emergency boration to the STP-134.001, Shutdown Margin Verification, determined Required Boron concentration is not required prior to tripping the Reactor per Step 3.4.e.
	RO	Refer to STP-134.001, Shutdown Margin Verification, to determine the required boron concentration needed for the anticipated Plant Mode and temperature:
	RO	Borate the outage Mixed Bed Demineralizer by placing in service per SOP-102, Section IV. **(N/A)**
	RO	When boration is no longer desired, perform the following: a) Close MVT-8104, EMERG BORATE. b) Verify no flow on FI-110, EMERG BORATE FLOW GPM.
	RO	Place RX TRIP Switch CS-CR01 in TRIP.
	RO	Verify all Reactor Trip and Bypass Breakers are open.
	RO	Verify all Rod Bottom lights are lit.

Op Test No.: 2011 NRC Scenario # 2 Event #s 7&8 Page 27 of 40

Event Description: Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3

Time	Position	Applicant's Actions or Behavior
	RO	If two or more Control Rods are not fully inserted, then emergency borate as follows: **(N/A)** 1) Open MVT-8104, EMERG BORATE. 2) Verify greater than 30 gpm flow on FI-110, EMERG BORATE FLOW GPM. 3) If required, refer to AOP-106.1, Emergency Boration, to establish greater than 30 gpm flow. 4) Borate 2500 gallons if two Control Rods are not fully inserted. 5) Borate 5800 gallons if greater than two Control Rods are not fully inserted.
	RO	Verify Reactor Power level is decreasing.
	BOP	Ensure RCS temperature is being maintained between 555°F and 559°F using the Steam Dump System or Steamline PORVs.
	RO	Place both SOURCE RANGE HIGH FLUX AT SHUTDOWN Switches in BLOCK.
		When Reactor Power decreases below 7.5 × 10^{-6}%, complete the following: 1) Verify P6 Permissive de-energizes to dim. 2) When on scale indication is observed, select both Source Range Channels on NR-45, NIS RECORDER.
	CRS	Proceed to Step 3.7.
	RO	Monitor Source Range counts per SOP-404, Excore Nuclear Instrumentation System.

Op Test No.: 2011 NRC	Scenario # 2	Event #s 7&8	Page 28 of 40
Event Description:	Progressive Failure of RCP "A" #1 seal, shutdown to MODE 3		

Time	Position	Applicant's Actions or Behavior

CAUTION 3.8

Shutdown Margin may decrease by as much as 3000 pcm due to Xenon decay over a 24 hour period. Any deviation from the conditions used in the Shutdown Margin calculation requires reverification of adequate Shutdown Margin.

At the discretion of the lead examiner proceed to the next event

Op Test No.: 2011 NRC	Scenario # 2	Event # 9, 10, & 11	Page 29 of 40				

Event Description: DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart

Time	Position	Applicant's Actions or Behavior

Booth Operator Instructions:
When directed, initiate Event 9 (Trigger 9)

Indications available:
Safety Injection

	CRS	Direct entry to EOP-1.0, Reactor Trip/Safety Injection Actuation
IOA	RO	Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.
IOA	BOP	Verify Turbine/Generator Trip: a. Verify all Turbine STM Stop VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.
IOA	BOP	Verify both ESF buses are energized.
IOA	RO	Check if SI is actuated: a. Check if either: • SI ACT status light is bright on XCP-6107 1-1. Or • Any red first out SI annunciator is lit on XCP-626 top row. b. Actuate SI using either SI ACTUATION Switch

Op Test No.: 2011 NRC	Scenario # 2	Event # 9, 10, & 11	Page 30 of 40				
Event Description:	DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart						

Time	Position	Applicant's Actions or Behavior
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
Evaluator Note: **The steps for Attachment 3, SI EQUIPMENT VERIFICATION can be found at the end of this scenario guide. (Page 38)**		
	Crew	Announce plant conditions over the page system.
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen. **(NO)**
	RO	Verify both the following annunciators are lit: • XCP-612 3-2 (RB SPR ACT). • XCP-612 4-2 (PHASE B ISOL).
	RO	Verify Phase B Isolation by ensuring RB SPRAY/PHASE B ISOL monitor lights are bright on XCP-6105.
CRITICAL TASK	RO	Ensure the following are open: • MVG-3001A(B), RWST TO SPRAY PUMP A(B) SUCT. • MVG-3002A(B), NAOH TO SPRAY PUMP A(B) SUCT. • MVG-3003A(B), SPRAY HDR ISOL LOOP A(B). **(NO)**
	RO	Ensure both RB Spray Pumps are running.
	RO	Stop all RCPs.

Op Test No.: 2011 NRC	Scenario # 2	Event # 9, 10, & 11	Page 31 of 40				

Event Description: DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart

Time	Position	Applicant's Actions or Behavior
	RO	Check RCS temperatures: With no RCP running, RCS Tcold is stable at OR trending to 557°F. **(NO)**
	RO	Close IPV-2231, MS/PEGGING STM TO DEAERATOR.
	RO	Continue to direct local throttling of EFW or if IA is restored throttle EFW.
	BOP	Initiate ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure.
	RO	Check if PZR PORVs are closed.
	RO	Check if PZR Spray Valves are closed.
	RO	Verify power is available to at least one PZR PORV Block Valve: • MVG-8000A, RELIEF 445 A ISOL. • MVG-8000B, RELIEF 444 B ISOL. • MVG-8000C, RELIEF 445 B ISOL
	RO	Verify at least one PZR PORV Block Valve is open.

NOTE - Step 11

Seal Injection flow should be maintained to all RCPs.

Op Test No.: 2011 NRC	Scenario # 2	Event # 9, 10, & 11	Page 32 of 40				

Event Description: DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart

Time	Position	Applicant's Actions or Behavior
	RO	Check if RCPs should be stopped: **(RCP's already stopped)**
	RO	Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner. • No SG is completely depressurized. **(NO)**
	CRS	GO TO EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, Step 1.
	CRS	Transition to EOP-16.0, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK, based on red path.

Note

Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.

Time	Position	Applicant's Actions or Behavior
	RO	Check if RCS pressure is GREATER THAN 250 psig.

CAUTION – Step 2

If the TD EFW Pump is the only available source of feed flow, the steam supply to the TD EFW Pump must be maintained from at least one SG, to maintain a secondary heat sink.

NOTE – Step 2

A FAULTED SG is any SG that is depressurizing in an uncontrolled manner OR that is completely depressurized.

Op Test No.: 2011 NRC	Scenario # 2	Event # 9, 10, & 11	Page 33 of 40

Event Description: DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart

Time	Position	Applicant's Actions or Behavior
	RO	Check RCS Tcold stable or increasing **(NO)**
	BOP	Ensure Steamline PORVs are closed.
	BOP	Ensure Condenser Steam Dump Valves are closed.
	RO	Stop any cooldown with the RHR System if it is in service. **(NO)**
	BOP	Maintain total EFW flow GREATER THAN 450 gpm until Narrow Range level is GREATER THAN 30% [50%] in at least one NON-FAULTED SG
	BOP	Reduce EFW flow to NON-FAULTED SG(s).
	BOP	Ensure valves associated with each FAULTED SG are closed: MS Isolation, PVM-2801A(B)(C) MS Isolation Bypass, PVM-2869A(B)(C)
	BOP	Close MVG-2802B, MS LOOP C TO TD EFP
	BOP	Open XMC1DB2Y 05EH, EMERG FEEDWATER PUMP MAIN STEAM BLOCK XVG2802B-MS (AB-463)
Booth Operator Instructions: **When called to open XMC1DB2Y 05EH use LOA/RESETS page to do so.**		

Op Test No.: 2011 NRC	Scenario # 2 Event # 9, 10, & 11	Page 34 of 40
Event Description:	DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart	

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	BOP	If any SG is NOT FAULTED, THEN isolate all feedwater to FAULTED SG(s) unless necessary for RCS temperature control.

Evaluator Note:
This is the first procedure step that directs isolation of EFW to the FAULTED SG (C). However, OAP-103.4, EOP/AOP USER'S GUIDE, allows the crew to isolate EFW prior to direction in the EOP's, but before 10 minutes after the break.

Time	Position	Applicant's Actions or Behavior
	RO	Verify power is available to the PZR PORV Block Valves: 1) MVG-8000A, RELIEF 445 A ISOL 2) MVG-8000B, RELIEF 444 B ISOL 3) MVG-8000C, RELIEF 445 B ISOL
	RO	Verify at least one PZR PORV Block Valve is open.

Caution – Step 4

If any PZR PORV opens because of high PZR pressure Step 4 should be repeated after pressure decreases to LESS THAN 2300 psig, to ensure the PORV recloses.

Time	Position	Applicant's Actions or Behavior
	RO	Check if the following Monitor Lights are bright: **(NO)** • Both XCP-6106 1-11 and 2-11 (RCS TO RHR IN ISOL 8701A(8702A) OPEN). OR • Both XCP-6106 1-12 and 2-12 (RCS TO RHR IN ISOL 8701B(8702B) OPEN
	CRS	GO TO Step 4.d.

Op Test No.:	2011 NRC	Scenario #	2	Event #	9, 10, & 11	Page	35 of 40
Event Description:	DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart						

Time	Position	Applicant's Actions or Behavior
	RO	Verify PZR pressure is LESS THAN 2335 psig.
	RO	Ensure all PZR PORVs are closed.
	RO	Verify SI flow on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM
	RO	Check if SI can be terminated: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 80°F. b. Check RVLIS level GREATER THAN the following: With 0 RCP's running RVLIS level 61% NR
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset Containment Isolation: • RESET PHASE A – TRAIN A(B) CNTMT ISOL • RESET PHASE B – TRAIN A(B) CNTMT ISOL
	BOP	Place both ESF LOADING SEQ A(B) RESETS to: a. NON-ESF LCKOUTS b. AUTO-START BLOCKS
	RO	Establish Instrument Air to the RB a. Start an IA compressor b. Open PVA-2659, INST AIR TO RB AIR SERV c. Open PVT-2660, AIR SPLY TO RB

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Event Description: DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart

Time	Position	Applicant's Actions or Behavior

Evaluator Note:
Until IA is restored, the PZR PORVs can be cycled using accumulators. IA should be restored prior to these accumulators running out, otherwise pressure control is lost (less likely after installation of large air bottles during the last outage).

Time	Position	Applicant's Actions or Behavior
	RO	Stop any RHR Pump operating in the SI mode.
	RO	Stop all but one Charging Pump.
	RO	Establish Normal Charging a. Close FCV-122, CHG FLOW b. Open both MVG-8107 and MVG-8108, CHG LINE ISOL. c. Adjust FCV-122, CHG FLOW, to obtain 60 gpm Charging flow. d. Close both MVG-8801A(B), HI HEAD TO COLD LEG INJ.

Evaluator Note:
Although FCV-122 cannot be controlled without IA the crew may place normal charging flow in service and control charging flow locally using XVT08403-CS, FCV0122-CS BYPASS in accordance with SOP-102. The crew may return to using seal injection and manually throttle XVT08388-CS, SEAL INJECT FILTER SUPPLY HDR ISOL VLV

Booth Operator Instructions:
If called to locally control charging flow in accordance with SOP-102, use LOA-CVC001, V 8403 - FV 122 BYPASS VALVE (Open), LOA-CVC002, V 8402B- FV 122 ISOL VALVE (Close) then throttle 8403. If IA is returned to service and local control is no longer necessary then Open 8402B when directed and then when directed close 8403.

Time	Position	Applicant's Actions or Behavior
	RO/CRS	Verify SI flow is NOT required: a. RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 30°F. b. Check RVLIS level GREATER THAN the following: With 0 RCPs running RVLIS level 61% NR.

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Event Description: DBA Main Steamline Break inside Reactor Building "C" SG Failure of Train B Phase A signal prevents spray from "B" train "B" SWBP fails to autostart

Time	Position	Applicant's Actions or Behavior
	Crew	Verify RCS T_{hot} is stable by using EFW control and SG PORVs

Evaluator Note:
The scenario can be terminated when SI flow is reduced, RCS T_{hot} is being maintained stable, and RB pressure rise is mitigated.

Op Test No.: 2011 NRC	Scenario # 2	Event # ATTACH 3	Page 38 of 40
Event Description:	EOP-1.0 Attachment 3		

Time	Position	Applicant's Actions or Behavior
		ATTACHMENT 3 - SI EQUIPMENT VERIFICATIONS
	BOP	Ensure EFW Pumps are running: a. Ensure both MD EFW pumps are running. b. Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Ensure the following EFW valves are open: • FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556), TD EFP TO SG A(B)(C) • MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm.
	BOP	Ensure FW Isolation: a. Ensure the following are closed: • FW Flow Control • FW Isolation, PVG-1611A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341). • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C). b. Ensure all Main FW Pumps are tripped
	BOP	Ensure SI Pumps are running: • Two Charging Pumps are running. • Both RHR Pumps are running.
	BOP	Ensure two RBCU Fans are running in slow speed (one per train)

Op Test No.: 2011 NRC	Scenario # 2	Event # ATTACH 3	Page 39 of 40
Event Description:	EOP-1.0 Attachment 3		

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	BOP	Verify Service Water to the RBCUs: a. Ensure two Service Water Pumps are running. b. Ensure both Service Water Booster Pumps A(B) are running. **(NO)** c. Verify GREATER THAN 2000 gpm flow for each train on: 1) FI-4466 , SWBP A DISCH FLOW GPM. 2) FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running.
	BOP	Ensure two Chilled Water Pumps and Chillers are running.
	BOP	Check if Main Steamlines should be isolated: a. Check if any of the following conditions are met: • RB pressure GREATER THAN 6.35 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F. b. Ensure ALL the following are closed: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Ensure Excess Letdown Isolation Valves are closed: • PVT-8153, XS LTDN ISOL. • PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed. **(NO)**

Op Test No.:	2011 NRC	Scenario #	2	Event #	ATTACH 3	Page	40	of 40
Event Description:	EOP-1.0 Attachment 3							

Time	Position	Applicant's Actions or Behavior
	BOP	Verify proper SI alignment: a. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. b. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. c. Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM. d. Check if RCS pressure is LESS THAN 250 psig. e. Verify RHR flow on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM AND • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.
	BOP	Verify proper SI alignment: f. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. g. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. h. Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM. i. Check if RCS pressure is LESS THAN 250 psig. j. Verify RHR flow on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM AND • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 1-3% Rx Power // Tave 557°F – 559°F // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2) // B1
Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in
3 hours

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	GOP 4A , step 3.5.c , SOP-214 Section III A step 2.10 a.	
	Operations scheduled for oncoming shifts:	
	Complete Chest and Turbine warming; hold power for RB Spray Pump and Diesel repairs.	
	Plant safeguard systems in degraded status:	
	"B" EDG LOTO, XPP0038 "B" RB Sprat Pump LOTO.	
		Initials
	In the Control Room, all books are replaced, the desk and console tops are clear, and all trash is properly disposed of.	
	Station Log completed.	

Oncoming Control Room Supervisor			Initials
Oncoming watch has reviewed the VCS Switchgear mailbox for switching orders.			
Plant Status (to be completed prior to turnover):			
Plant ESF System Status:			
Component Cooling System			
Service water System			
Reactor Building Cooling System			
Reactor Building Spray System			
Accumulator Tanks			
RHR System			
Charging/Safety Injection System			
Emergency Feedwater System			
Diesel Generator			
Chilled Water System			
Control Room Ventilation System			
Position indications, power availability, and annunciator alarms are normal for present plant conditions.			
Plant Parameters	Limit		
Reactor Power	0-100%		
RCS Tavg	≤589.2°F per loop		
RCS Pressure	<2385 psig		
RCS Flow	>100% per loop		
RCS Subcooling	Normal		
All parameters within allowable limits for plant conditions. If not, what actions are being taken to correct conditions:			
Review of Logs:			
Station Log			
Removal and Restoration Log			
Tagout Log			
Special Orders			
Shift Turnover (to be completed during turnover):			
Briefing on plant conditions by offgoing Control Room Supervisor.			
Review of SPDS and BISI displays.			
Identification of in-progress procedures including their present status and locations.			

CHG C

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Control Room Supervisor	
	Offgoing Control Room Supervisor	
	Shift Supervisor review	

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 1-3% Rx Power // Tave 557°F – 559°F // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2- Thumderstorms) /
/ B1 Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in
3 hours

Offgoing Reactor Operator	Initials
Main Control Board (Reactor Operator portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Reactor Operator area of responsibility.	

Oncoming Reactor Operator	Initials
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	

System Alignment	A	B	C	Train aligned to	Reasons for any inoperable equipment
Service Water Pumps	X	X		A	
Component Cooling Pumps	X			A	
Charging Pumps	X			A	
HVAC Chillers	X			A	
Reactor Building Spray Pumps					
RHR Pumps					
			TDEFP		
Emergency Feedwater Pumps					
Inoperable Radiation Monitors					

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Reactor Operator	
	Offgoing Reactor Operator	
	Shift Supervisor review	

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 1-3% Rx Power // Tave 557°F – 559°F // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x2- Thumderstorms) / / XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Balance Of Plant	Initials
Main Control Board (Balance Of Plant portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Balance Of Plant area of responsibility.	

Oncoming Balance Of Plant	Initials
Review of Main Control Room Panels.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Test annunciator lights (with Offgoing operator concurrence).	

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Balance Of Plant	
	Offgoing Balance Of Plant	
	Shift Supervisor review	

Facility: VC SUMMER	Scenario No.:3	Op Test No.:	**2011 NRC**
Examiners:		Operators:	CRS
			RO
			BOP

Initial Conditions:
- The power was reduced to replace and test a FWIV actuator
- IC-40, 25% Power, BOL, GOP-4a, Step 3.12C (IC-303 for 2011)
- "B" EDG is OOS to clean the lube oil strainer
- "B" RB spray pump is out of service for bearing replacement
- National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area

Turnover:
- Increase power to 38% per GOP

Critical Task:
- Restore High head safety injection
- Control EFW flow to "C" SG prior to filling generator above 90% (WOG M.08)
- Establish Containment Isolation

Event No.	Malf. No.	Event Type*	Event Description
1.		N-BOP,CRS R-RO	Power escalation toward 38%
2.	XMT-MS036O	I– BOP,CRS	SG pressure transmitter PT-2010 fails high, opening SG PORV BOP1
3.	MSS001E	I-BOP, TS-CRS	Compensating "B" SG pressure transmitter PT-485 fails high, increasing Main Feedwater flow BOP2
4.	RCS007C	C– RO, TS-CRS	"C" RCP vibrations ramp up, pump must be shutdown RO1
5.	PRS001B	C-RO, CRS	PT-445 fails high RO2
6.	CCW007A PMP-CC003F. PMP-CC002B	C-RO, CRS	Running CCW pump trips. Standby pump on A train fails to start. Opposite Train pump starts but bearing fails, causing high amps then overcurrent trip.
7.		C-ALL	Trip reactor and reactor coolant pumps due to loss of CCW
8.	VLV-EF005F	C– BOP, CRS	FCV 3551 MDEFW to C SG fails as is (open)
9.	PRS007A	M-ALL, C-RO	Pressurizer Safety valve fails open, requiring manual SI alignment
			Terminate after EOP-2.1 (Post LOCA Cooldown and Depressurization) entry

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

DRAFT

VC Summer NRC Scenario #3

The crew will assume the watch having pre-briefed on the Initial Conditions (25% power, BOL) increasing power to 38% per GOP-4A.

The crew increases power until the Lead Evaluator directs inserting the first malfunction.

SG pressure transmitter PT-2010 fails high, opening SG PORV PCV-2010. BOP places controller PK-2010 in MANUAL and closes the PORV to prevent uncontrolled power increase and loss of condenser inventory.

PT-485, SG "B" compensating pressure channel fails high, requiring action to prevent overfeeding the "B" SG due to indicated feed flow/steam flow mismatch. CRS must evaluate Tech Specs for SG pressure transmitter failure.

Reactor Coolant Pump vibrations ramp up. Since reactor power is below P-8 (38%) the RO can secure the RCP per ARP-619 point 1-3, RCP C VIBR HI. The BOP must control SG level in the idle loop and the CRS must evaluate Tech Spec 3.4.1.1 and begin a power reduction to MODE 3 over the next hour.

Pressurizer Pressure Transmitter PT-445 fails high, causing two Pressurizer PORVS to open. The PORVs will cycle open and closed at the P-11 interlock pressure of 1970 psig. The RO will close the PORVs and their block valves per AOP-401.5 PRESSURIZER PRESSURE CONTROL CHANNEL FAILURE. The CRS will check that this satisfies Technical Specification 3.4.4 for the PORVs.

All Component Cooling Water flow is lost due to trip of the running pump and failure of the standby pump to start. The RO momentarily restores CCW by starting the opposite train pump and transferring non-essential CCW loads (including RCPs). The one remaining pump then seizes. This will require the crew to trip the reactor and the running RCPs within 10 minutes per AOP-118.1 TOTAL LOSS OF COMPONENT COOLING WATER. The CRS will implement EOP-1.0, REACTOR TRIP OR SAFETY INJECTION in conjunction with the AOP. Alternate cooling to the charging pumps must be established within 20 minutes to prevent a loss of RCP seal cooling (loss of CCW and RCP seals together account for 28% of the core damage frequency).

When the crew attempts to throttle AFW, FCV 3551 MDEFW to C SG will be found to be failed open. The crew will have to either establish local control of the valve or secure the motor-driven EFW pumps and realign the turbine-driven pump prior to overfilling the C SG.

CCW is restored by swapping breakers on the originally running pump. Last event is entered after CCW loads are evaluated in AOP-118.1.

A Pressurizer Safety valve drifts open with a total failure of the Solid State Protection System. Crew must return to EOP-1.0 (WOG E-0) and use Att. 3 to manually align Safeguards systems. Scenario may be terminated after entry in EOP-2.1.

VCS 2011 NRC Scenario 3 Simulator Setup

Initial Conditions:

- IC-40, 25% Power, BOL, GOP-4a, Step 3.12 (IC 303 for 2011)
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires.

VCS 2011 NRC Scenario 3 Simulator Setup (SNAP 303)

- Conduct two-minute drill
- Mark up procedures in use with "Circle and slash" as applicable

Pre-Exercise:

Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.)

TQP-801 Booth Operator checklist, has been completed

Hang Red Tags for equipment out of service

Put copy of AOP-118.1 ATT. 3 pg. 4 in booth

PRE-LOAD

- MAL-CCW007C standby Component Cooling Water pump fails to start
- Override OVR-EF015A & EF015B = 100% Flow control valve from Motor-driven EFW to C SG fails as-is (open)
- LOA AUX 118 = RACK OUT "B" RB Spray pump breaker
- LOA-EPS114 = MAINTENANCE ("B" EDG OOS)
- MAL PCS-005A and B, Total Failure of SI

EVENT 1: Power escalation toward 38%

- No simulator manipulations required
- Next event on lead examiner cue

EVENT 2: SG "A" steam pressure transmitter fails high

- Trigger 2, XMT-MS036O = 1300#, no ramp
- Transmitter will not be repaired
- Steam Generator Power Relief Valve will remain in MANUAL

EVENT 3: "B" SG compensating pressure transmitter fails high

- Trigger 3, Malfunction MSS001E = 1300#, 30 second ramp
- Transmitter will not be repaired
- Steam and feed flow will remain selected to alternate channel

EVENT 4: Reactor Coolant Pump vibrations require RCP trip

- Trigger 4, Malfunction RCS007C = 30 mils, 3 minute ramp
- Power is low enough for crew to trip RCP
- Insert and remove VLV-CS05W to install fuse for 8141C

EVENT 5: Pressurizer Pressure Transmitter PT-445 fails high, opening two PORVs

- Trigger 5, Malfunction PRS001B = 2500#, 2 minute ramp
- Pressure transmitter will not be repaired

EVENT 6: Trip of running Component Cooling Water pump and failure of other pumps

- Trigger 6, Malfunction CCW007A, trip of "A' CCW pump
- PMP CC002B = 10, 3 minute Time Delay, 6 minute ramped bearing Seizure of "B" train CCW pump
- Clear PMP003F after RCP trip, when directed as electrical maintenance to charge springs

EVENT 7: Pressurizer Safety drifts open

- Trigger 7, Malfunction PRS007A "A" safety drifts fully open, 5 minute ramp
- Crew must operate individual pumps and valves due to total SSPS failure

Trigger 8 Local action to vent Deaerator

- LOA-FWM055, DEAERATOR VENT VALVE 2210-HV , = 1.0 (open), 5 minute TD
-

Trigger 9 Local action to throttle condensate to blow down heat exchanger flow

- LOA-CND044,045,046 TC-3062A/B/C A/M station mode to MANUAL
- LOA-CND047,048,049 TC-3062A/B/C manual output to 10% open

Local action restore control of seal injection flow

- Remove Malfunction VLV-CS010A to restore air to HCV-186

Local action to throttle EFW flow

- Modify Malfunction VLV-EF005F as requested to position FCV-3551

Op Test No.: 2011 NRC	Scenario # 3	Event # 1	Page 5 of 54
Event Description:	Raise power in accordance with GOP-4A towards 38%		

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **No action required for event 1**		
Indications available: **None Applicable**		
	BOP	Select 1/2 on RATE %/MIN.
	BOP	Increase LOAD SET in 2% increments to attain 38% Reactor Power.
	Crew	At 250 MWe perform the following: 1) Ensure all Extraction Drain Valves are latched. 2) Contact Electrical Maintenance to perform thermography on manual disconnects 8901 and 8903.
Booth Operator Instructions: **When called to ensure all extraction drain valves are latched wait 15 min and then report that they are all latched.** **When called to perform thermography on the manual disconnects wait 15 min and then report that thermography indicated good closure of the disconnects.**		
	Crew	At 300 MWe, call the TB operator to perform the following to start filling the drain lines from the 2A and 2B Heaters to the DA: 1) Open XVT12083-HD, 1" BYPASS VALVE FOR XVG-02075 (TB-412) (requires ladder). 2) Open XVT12085-HD, 1" BYPASS VALVE FOR XVG-02074 (TB-412). 3) Throttle XVT02018A-HD, FW HTR 2A DRN TO DEAER LVL CONT VLV BYP, ten turns off the closed seat (TB-463). 4) Throttle XVT02018B-HD, FW HTR 2B DRN TO DEAER LVL CONT VLV BYP, ten turns off the closed seat (TB-463).

Op Test No.: 2011 NRC	Scenario # 3	Event # 1	Page 6 of 54
Event Description:	Raise power in accordance with GOP-4A towards 38%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When called to start filling the drain lines from the 2 heaters to the DA time compress 20 minutes and then report that based on flow noise it appears that the line to the DA is full.**		
	BOP	Place a second Condensate Pump in service per SOP-208, Condensate System, when total Condensate flow approaches 9000 gpm as indicated on the following: 1) FI 3026, PUMP A DISCH FLOW. 2) FI 3036, PUMP B DISCH FLOW. 3) FI 3046, PUMP C DISCH FLOW.
	BOP	Ensure the discharge valve for the pump to be started is closed: a. XVB-614A, A DISCH ISOL. b. XVB-614B, B DISCH ISOL. c. XVB-614C, C DISCH ISOL.
	BOP	Start one of the following: (PEER ✓) a. XPP-0042A, CO PUMP A. b. XPP-0042B, CO PUMP B. c. XPP-0042C, CO PUMP C.
	BOP	Open the associated pump discharge valve: (PEER ✓) a. XVB-614A, A DISCH ISOL. b. XVB-614B, B DISCH ISOL. c. XVB-614C, C DISCH ISOL.
Evaluator Note: **The following steps are for alternate dilution that may occur on the power increase.**		

Op Test No.: 2011 NRC	Scenario # 3	Event # 1	Page 7 of 54
Event Description:	Raise power in accordance with GOP-4A towards 38%		

Time	Position	Applicant's Actions or Behavior
		NOTE 2.0 1. Energizing additional Pressurizer Heaters will enhance mixing. 2. LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.
	RO	Verify at least one Reactor Coolant Pump is running.
	RO	Place RX COOL SYS MU switch to STOP.
	RO	Place RX COOL SYS MU MODE SELECT switch to ALT DIL. (Peer ✓)
	RO	Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate.
	RO	Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. (Peer ✓)
	RO	Place RX COOL SYS MU switch to START.
	RO	Verify desired flow rate on FR-113, TOTAL MU GPM (F-168).
	RO	Verify alternate dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator.
	RO	Place RX COOL SYS MU switch to STOP.

Op Test No.: 2011 NRC	Scenario # 3	Event # 1	Page 8 of 54				
Event Description:	Raise power in accordance with GOP-4A towards 38%						

Time	Position	Applicant's Actions or Behavior
	RO	Place RX COOL SYS MU MODE SELECT switch to AUTO. (Peer ✓)
	RO	Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm).
	RO	Place RX COOL SYS MU switch to START.
At discretion of the Lead Examiner, proceed to the next event		

Op Test No.: 2011 NRC	Scenario # 3	Event # 2	Page 9 of 54	

Event Description: SG pressure transmitter PT-2010 fails high, opening SG PORV

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, activate trigger 2**		
Indications available: **Power Rise.** **PORV open indication.**		
	BOP	Determines that PT-2010 has failed high.
	BOP	Places PCV-2010, B SD/ PWR RLF in PWR RLF
Evaluator Note: **If the switch is not taken to PWR RLF then the relief valve will not close.**		
	BOP	Takes M/A station for PWR RELIEF B SETPT to MAN and CLOSED.
	Crew	Notifies I&C of failure
Booth Operator Instructions: **When called respond as I&C that a troubleshooting plan is being developed.**		
At the discretion of the Lead Examiner, proceed to the next event		

Op Test No.:	2011 NRC	Scenario #	3	Event #	3	Page	10	of 54

Event Description: Compensating "B" SG pressure transmitter PT-485 fails high, raising Main Feedwater flow

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: **When directed, activate trigger 3**
		Indications available: **XCP-624, 4-1, SG A STMLN ΔP HI** **XCP-624, 6-1, SG C STMLN ΔP HI** **Increasing Feed flow to B SG.**
	Crew	Refer to alarm response procedures
		PROBABLE CAUSE: 1. Steam line break. 2. Instrument failure. 3. Testing in progress.
		AUTOMATIC ACTIONS: 1. Safety Injection when steam line A is 97 psi lower than both the other steam lines as sensed by 2 of 3 pressure channels on steam lines A and C and on A and B.(**NO**, signal is only 1/3)
		CORRECTIVE ACTIONS:
	BOP	Verify steam line pressure indications on the Main Control Board.
		SUPPLEMENTAL ACTIONS:
	CRS	If an instrument channel failed, go to AOP-401.3, Steam Flow - Feedwater Flow Protection Channel Failure.
IOA	BOP	Verify the failed channel is the controlling channel (**YES**).

Op Test No.: 2011 NRC Scenario # 3 Event # 3 Page 11 of 54

Event Description: Compensating "B" SG pressure transmitter PT-485 fails high, raising Main Feedwater flow

Time	Position	Applicant's Actions or Behavior
IOA	BOP	Select the operable flow channel: • Place FW CONTROL CHANNEL SEL Switch to the operable channel. • Place STEAM CONTROL CHANNEL SEL Switch to the operable channel.
IOA	BOP	Verify Turbine Load is LESS THAN 950 MWe.**(YES)**
IOA	BOP	Verify only one SG is AFFECTED. **(YES)**
IOA	BOP	Adjust the Feedwater Flow Control Valve as necessary to restore feed flow to the AFFECTED SG
IOA	BOP	Check if Feedwater Pump speed control is operating properly: • Feedwater Header pressure is GREATER THAN Main Steam Header pressure. • Feed flow is normal for steam flow and power level. • All operating Feedwater Pump speeds and flows are balanced.
	BOP	Verify Narrow Range levels in all SGs are between 60% and 65%.
		Restore the AFFECTED SG control systems to normal: • Place the Feedwater Flow Control Valve in AUTO. • Place the Feedwater Pump Speed Control System in AUTO. REFER TO SOP-210, FEEDWATER SYSTEM.

Op Test No.:	2011 NRC	Scenario #	3	Event #	3	Page	12	of 54

Event Description: Compensating "B" SG pressure transmitter PT-485 fails high, raising Main Feedwater flow

Time	Position	Applicant's Actions or Behavior

NOTE - Step 9

Steam flow transmitters FT-474, FT-484, FT-494, FT-475, FT-485, and FT-495 are density compensated by steam pressure transmitters PT-475, PT-485, PT-495, PT-476, PT-486, and PT-496.

	CRS	Within 72 hours, place the failed channel protection bistables in a tripped condition: PB-485A PB-485B-1 PB-485B-2 PB-475B-1 PB-475B-2 FB-488B
	CRS	Identify Technical Specifications: Table 3.3-1 Item 14: Action 6 Trip bistables in 72 hours (may be bypassed for testing for up to 12 hours) Table 3.3-3 Items 1.e, 1.f, 4.e: Action 24 Trip bistables in 72 hours (may be bypassed for testing for up to 12 hours)
	Crew	Determine and correct the cause of the channel failure.

Booth Operator Instructions:
When called as I&C, report that you will develop a troubleshooting plan.

When Technical specifications are determined or at the discretion of the Lead Examiner proceed to the next event

Op Test No.: 2011 NRC	Scenario # 3	Event # 4	Page 13 of 54	
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump			

Time	Position	Applicant's Actions or Behavior

Booth Instructor:
When directed, activate trigger 4.

Indications available:
XCP-619 1-3, RCP C VIBR HI

	Crew	Refer to alarm response procedure
		PROBABLE CAUSE: 1. Pump shaft vibration caused by: a. Bearing wear. b. Impeller imbalance. c. Misalignment. d. Seismic event. 2. Pump frame vibration caused by: a. Excess shaft vibration. b. Seismic event. 3. Flywheel imbalance. 4. Loss of Coolant Accident.
		AUTOMATIC ACTIONS: 1. None.

CAUTION

Reactor Coolant Pump shaft and frame vibrations should increase simultaneously on actual Reactor Coolant Pump high vibration. Channel failure is indicated by the associated shaft or frame bar graph going to zero on the Yokogowa DX 1000 recorder.

Op Test No.: 2011 NRC	Scenario # 3	Event # 4	Page 14 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump		

Time	Position	Applicant's Actions or Behavior

NOTE

a. This alarm has reflash capabilities.

b. This alarm causes XCP-606 3-5, REACTOR BUILDING FANS VIBRATION F MON FLT/WARN to annunciate.

Time	Position	Applicant's Actions or Behavior
		CORRECTIVE ACTIONS:
	RO	Monitor Reactor Coolant Pump C vibration indicators to determine the source and severity of the vibration.
	RO	Monitor RCS temperature and pressure to verify they are within limits for Reactor Coolant Pump operation.
		SUPPLEMENTAL ACTIONS:
	Crew	With Reactor Coolant Pump C shaft vibration greater than or equal to 20 mils or greater than or equal to 15 mils and increasing at greater than one mil per hour, perform one of the following: a. If Reactor Power is greater than 38%, trip the Reactor and secure Reactor Coolant Pump C per SOP-101. **(NO)** b. If Reactor Power is less than 38%, secure Reactor Coolant Pump C per SOP-101 and proceed to Hot Standby per GOP-4B, Power Operation (Mode 1 - Descending), and GOP-5, Reactor Shutdown From Startup to Hot Standby (Mode 2 to Mode 3), within one hour. **(YES)**

Op Test No.: 2011 NRC	Scenario # 3 Event # 4	Page 15 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump	

Time	Position	Applicant's Actions or Behavior
	Crew	2. With Reactor Coolant Pump C frame vibration greater than or equal to five mils or greater than three mils and increasing at greater than 0.2 mils per hour, perform one of the following: a. If Reactor Power is greater than 38%, trip the Reactor and secure Reactor Coolant Pump C per SOP-101. b. If Reactor Power is less than 38% **(YES)**, secure Reactor Coolant Pump C per SOP-101 and proceed to Hot Standby per GOP-4B, Power Operation (Mode 1 - Descending), and GOP-5, Reactor Shutdown From Startup to Hot Standby (Mode 2 to Mode 3), within one hour.
NOTE 1.1 The applicable section of Tech Spec 3.4.1 must be met when removing a Reactor Coolant Pump from service.		
	Crew	Verifies reactor power is less than 38% (P-8 permissive is illuminated).
	CRS	Acknowledges that the plant is being placed in Hot Standby.
	RO	Place the associated following Pressurizer Spray Valve for the affected Reactor Coolant Pump in MAN and close: a. PCV 444D, PZR SPRAY, for Reactor Coolant Pump A. **(NO)** b. PCV 444C, PZR SPRAY, for Reactor Coolant Pump C. **(YES)**
	RO	If the RCS is solid, place PCV-145, LO PRESS LTDN, in MAN. **(NO)**
	RO	Secure one of the following Reactor Coolant Pumps as required: a. XPP-0030A, PUMP A. **(NO)** b. XPP-0030B, PUMP B. **(NO)** c. XPP-0030C, PUMP C. **(YES)**

Op Test No.: 2011 NRC	Scenario # 3	Event # 4	Page 16 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump		

Time	Position	Applicant's Actions or Behavior
	RO	If the RCS is solid, return PCV-145, LO PRESS LTDN, to AUTO, if desired. **(NO)**
	RO	Verify Seal Injection to the secured Reactor Coolant Pump using the applicable following indicator: a. FI-130A, RCP A INJ FLO GPM. b. FI-127A, RCP B INJ FLO GPM. c. FI-124A, RCP C INJ FLO GPM.
	Crew	Maintain Component Cooling Water to the secured Reactor Coolant Pump thermal barrier until RCS temperature is less than 150°F.
	BOP	Place the following controllers in MAN, as required for the affected RCS loop and maintain Narrow Range Steam Generator level between 60% and 65%: a. PVT-478, SG A FWF. b. FCV-3321, LOOP A MAIN FW BYP. c. PVT-488, SG B FWF. d. FCV-3331, LOOP B MAIN FW BYP. e. PVT-498, SG C FWF. f. FCV-3341, LOOP C MAIN FW BYP.
CAUTION 2.8 Per Tech Spec 3.4.1.1, the plant must be in Hot Standby within one hour of securing the Reactor Coolant Pump.		
	CRS	If not already in Hot Standby, proceed to Hot Standby in accordance with GOP-4B, Power Operation (Mode 1 - Descending), or GOP-4C, Rapid Power Reduction, and GOP-5, Reactor Shutdown From Startup To Hot Standby (Mode 2 To Mode 3).

Op Test No.:	2011 NRC	Scenario #	3	Event #	4	Page	17 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump						

Time	Position	Applicant's Actions or Behavior
		CAUTION 3.1 through 3.12 a. Thermal Power changes of greater than 15% in any one-hour period requires completion of GTP-702 Attachment III.H. b. VCS PID Report, POWER CHANGE SEARCH, should be periodically performed to ensure a thermal power change of greater than 15% in any one-hour period is detected.
		NOTE 3.1 through 3.12 a. Step 3.1 lowers Reactor Power from 100% to 90%. b. If the RCS will be opened for maintenance during the shutdown, degassing of the RCS should be initiated per SOP-102, Chemical And Volume Control System. c. The setpoint for IFK3136, FLOW TO DEAERATOR, should be adjusted during power changes to maintain LI-3136, DEAER STOR TK NR LVL, between 2.5 and 5.0 feet.
		Evaluator Note: **This guide does not include steps to lower power down to 38%.**
		NOTE 3.3 Step 3.3 lowers Reactor Power from 48% to 25%.
	BOP	Reduce load a. De-energize the LOAD LIMIT circuit per SOP-214, Main Turbine and Controls. b. Energize the DEC LOAD RATE circuit. c. Select desired rate on LOAD RATE LMT-% PER MIN. d. Decrease LOAD SET to attain 25% Reactor Power or to the Generator load desired.

Op Test No.: 2011 NRC	Scenario # 3 Event # 4	Page 18 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump	

Time	Position	Applicant's Actions or Behavior
	BOP	As load decreases, adjust Megavars using GEN FIELD VOLT ADJ as requested by the Load Dispatcher and within the Estimated Generator Capability curve (Enclosure A).
	RO	As load decreases, Borate or dilute per SOP-106, Reactor Makeup Water System, to maintain Control Rods above the Rod Insertion Limit.
	BOP	Between 30% and 35% Reactor Power, reduce to two Feedwater Booster Pumps per SOP-210, Feedwater System.
	BOP	As load decreases, maintain the Blowdown Heat Exchanger condensate outlet temperatures at least 30 degrees below the DA temperature.
	Crew	When Reactor Power is less than 25%, commence cooling the Feedwater system to less than 180°F as follows: a. Place the following Feedwater Heaters in ISOLAT (I icon) (GRAPHIC 101, 102, 103, 104 or 110 screens): 1) FW HTR 1A OPRTR SELECT ISOLATION. 2) FW HTR 1B OPRTR SELECT ISOLATION. 3) FW HTR 2A OPRTR SELECT ISOLATION. 4) FW HTR 2B OPRTR SELECT ISOLATION. 5) FW HTR 4A OPRTR SELECT ISOLATION. 6) FW HTR 4B OPRTR SELECT ISOLATION. b. Isolate 7th Stage Extraction Steam to the DA as follows: 1) Place IPV-2231, MS/PEGGING STM TO DEAERATOR, in MAN and close. 2) Close MVG-1212, EXT STM TO DEAER ISOL. c. Open XVG02210-HV, FW HTR DEAERATOR VENT ORF BYP HDR ISOL (TB-463).

Op Test No.: 2011 NRC	Scenario # 3	Event # 4	Page 19 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump		

Time	Position	Applicant's Actions or Behavior

Booth Operator Instructions:
When called to Open XVG02210-HV, FW HTR DEAERATOR VENT ORF BYP HDR ISOL use LOA-FWM055, DEAERATOR VENT VALVE 2210-HV (Trigger 8)and then report that it is open.

	Crew	At less than 25% Reactor Power, verify the following status lights de-energize to dim: 1) CHAN I IR FLUX HI. 2) CHAN II IR FLUX HI. 3) CHAN I PR FLUX LO SET PT. 4) CHAN II PR FLUX LO SET PT. 5) CHAN III PR FLUX LO SET PT. 6) CHAN IV PR FLUX LO SET PT.
	BOP	When total Condensate flow on the following indicators is less than 9000 gpm, reduce to one Condensate Pump running per SOP-208, Condensate System: 1) FI-3026, PUMP A DISCH FLOW. 2) FI-3036, PUMP B DISCH FLOW. 3) FI-3046, PUMP C DISCH FLOW.
		Maintain DA level and temperature control as follows: 1) If necessary to maintain DA level, place FC-3136, FLOW TO DEAERATOR, in MAN. 2) Adjust IPV-2231, MS/PEGGING STM TO DEAERATOR, as necessary, to maintain DA temperature between 130°F and 150°F. 3) If DA cooling is required, LCV 3235, DEAER START UP DRAIN CNTRL, may be used to raise flow through the DA. 4) Ensure Steam Generator Blowdown Condensate return temperature is maintained less than or equal to DA temperature as load is reduced.

Op Test No.: 2011 NRC	Scenario # 3	Event # 4	Page 20 of 54
Event Description:	RCP seal leakage requires trip of Reactor Coolant Pump		

Time	Position	Applicant's Actions or Behavior
	BOP	As load decreases, transfer the Steam Dumps to the Steam Pressure Mode as follows: 1) Place the STM DUMP CNTRL m/a station in MAN. 2) Place the STM DUMP MODE SELECT Switch in STM PRESS. 3) Adjust the STM DUMP CNTRL m/a station setpoint to 8.4. 4) Place the STM DUMP CNTRL m/a station in AUTO.

At the discretion of the Lead Examiner, proceed to the next event

Op Test No.:	2011 NRC	Scenario #	3	Event #	5	Page	21	of 54
Event Description:	PT-445 fails high							

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, activate trigger 5**		
Indications available: **XCP-616, 2-3, PZR PRESS HI/LO** **XCP-616, 2-6, PZR CNTRL PRESS HI** **XCP-616, 4-1, PZR SAFETY VLV LINE TEMP HI** **XCP-616, 4-2, PZR RLF LINE TEMP HI** **XCP-616, 4-3, PZR RLF VLV ISOL** **2 PORV's cycling at 1970 psig**		
	Crew	Refer to alarm response procedures
	Crew	Refer to XCP-616, 2-6
		PROBABLE CAUSE: 1. Instrument failure. 2. Rapid load reduction.
		AUTOMATIC ACTIONS: 1. PCV-445A(445B), PWR RELIEF, open.
		CORRECTIVE ACTIONS:
	RO	Compare PI-445, CNTL CHAN PRESS PSIG, with other Pressurizer pressure indications to determine if IPT00445, PRESSURIZER PRESSURE CONTROL PRESS XMTR, has failed high **(YES)**.

Op Test No.: 2011 NRC	Scenario # 3	Event # 5	Page 22 of 54
Event Description:	PT-445 fails high		

Time	Position	Applicant's Actions or Behavior
	RO	If IPT00445, PRESSURIZER PRESSURE CONTROL PRESS XMTR, has failed high, perform the following: a. Close PCV-445A, PWR RELIEF and PCV-445B, PWR RELIEF. b. Refer to AOP-401.5, Pressurizer Pressure Control Channel Failure.
	CRS	Transition to AOP-401.5, Pressurizer Pressure Control Channel Failure
NOTE: Through this procedure, "AFFECTED" refers to any PZR PORV that has actuated as a result of the instrument failure.		
IOA	RO	Verify the PZR PORVs are closed: **(NO)**
IOA	RO	IF PZR pressure is LESS THAN 2300 psig, THEN perform the following: Close the AFFECTED PZR PORV(s): • PCV-445A, PWR RELIEF **(YES)** • PCV-445B, PWR RELIEF **(YES)** • PCV-444B, PWR RELIEF **(NO)**
NOTE – Step 2 PZR PRESS control channels PI-444 and PI-445 connect to the same reference leg line as protection channel PI-457.		
IOA	RO	Compare the PZR control channel indication to the protection channel indications: **(ONLY 445 reading high)** • PI-455, PRESS PSIG • PI-456, PRESS PSIG • PI-457, PRESS PSIG

Op Test No.: 2011 NRC	Scenario # 3	Event # 5	Page 23 of 54
Event Description:	PT-445 fails high		

Time	Position	Applicant's Actions or Behavior
IOA	RO	Check if PI-444, CNTROL CHAN PRESS PSIG, indication is NORMAL. **(YES)**
	RO	Check if PI-445, CNTRL CHAN PRESS PSIG, indication is NORMAL. **(NO)**
	RO	If PT-445 is failed, THEN within one hour close the AFFECTED PORV Block Valves: • MVG-8000A, RELIEF 445 A ISOL • MVG-8000C, RELIEF 445 B ISOL
	CRS	Determine above action satisfies Technical Specification 3.4.4 Action a. "With one or more PORV(s) inoperable and capable of being manually cycled, within 1 hour: 1) Restore the PORV(s) to OPERABLE status or 2) Close the associated block valve(s) and maintain power to the block valve; otherwise, be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.
	RO	Ensure ROD CNTRL BANK SEL Switch is in AUTO.
*	RO	Maintain RCS pressure between 2220 psig and 2250 psig.
	CRS	While regaining pressure monitor Technical Specification:3.2.5: Indicated Pressurizer Pressure ≥ 2206 psig Action: With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 4 hours.

Op Test No.:	2011 NRC	Scenario #	3	Event #	5	Page	24	of 54
Event Description:	PT-445 fails high							

Time	Position	Applicant's Actions or Behavior
	Crew	Determine and correct the cause of the channel failure.

Booth Operator Instructions:
When called that PT-445 has failed high report as I&C that a troubleshooting plan is being developed.

At the discretion of the Lead Examiner, proceed to the next event.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8			Page 25 of 54		
Event Description:	Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)						

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, activate Trigger 6.**		
Indications available: **XCP-601 1-3, CCP A/C TRIP FAIL** **Other CCW low flow alarms**		
	Crew	Refer to alarm response procedures
		PROBABLE CAUSE: 1. Overcurrent trip in conjunction with an overload alarm.
		AUTOMATIC ACTIONS: Standby pump starts. **(Starts but indication of a sheared shaft)**
NOTE This alarm has reflash capabilities.		
		CORRECTIVE ACTIONS:
	RO	Ensure the standby pump starts. **(Starts but with sheared shaft)**

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 26 of 54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior

CAUTION 2

a. Any Charging Pump can continue to be operated on a loss of Component Cooling Water to its oil coolers within one of the following:

1) 20 minutes without local temperature monitoring.

OR

2) No time limit as long as any maximum temperature of Attachment 1, Charging Pump Temperature Monitoring, Page 4 of 4, of AOP-118.1, Total Loss of Component Cooling, is NOT exceeded AND local Charging Pump temperature monitoring remains in place.

	RO	If no Train A pumps are running, perform the following: a. Ensure a Train B Component Cooling Pump is running. b. Start a Train B Charging Pump. c. Stop the Train A Charging Pump.
	RO	If a Train B Component Cooling Pump was started, establish Train B as the active loop per SOP-118. **(B CCW overloads)**
	RO	Verify system pressures, temperatures, and flows are normal. **(NO)**
	CRS	If no Component Cooling Pumps can be started, then go to AOP-118.1, Total Loss of Component Cooling Water.
		SUPPLEMENTAL ACTIONS:
	Crew	Determine the cause of the pump trip and correct as soon as possible.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 27 of 54	
Event Description:	Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)			

Time	Position	Applicant's Actions or Behavior

Booth Operator Instructions:
When called to investigate the CCW system report that;

- **nothing can be seen wrong with the A CCW pump but that the A breaker has a 51 relay flag dropped on the A phase.**
- **C breaker closing springs are discharged**
- **B has an overheated bearing housing**

When called as electrical maintenance report a bad spring charging motor for A CCW pump and that it is being replaced. Wait 30 min and then report that C CCW can be started.

	CRS	Transition to AOP-118.1, Total Loss of Component Cooling Water.

CAUTION

- Any Charging Pump can be started or continue to be operated on a loss of Component Cooling Water to its oil coolers within one of the following:
  - o 20 minutes without local Charging Pump temperature monitoring.
    OR
  - o No time limit as long as any maximum temperature of Attachment 1, Charging Pump Temperature Monitoring, Page 4 of 4, is NOT exceeded AND local Charging Pump temperature monitoring remains in place.

- Any running Reactor Coolant Pump should be stopped if any of the following conditions exist:
  a. Component Cooling Water flow to the motor bearing coolers can NOT be restored within ten minutes.
  b. Motor Bearing temperature exceeds 195°F.
  c. Lower Seal Water Bearing temperature exceeds 225°F.
  d. Seal Water Outlet temperature exceeds 235°F

NOTE

If a Reactor trip occurs, this procedure should be continued concurrently with the recovery actions of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 28 of 54				

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
IOA	RO	Determine the cause for the loss of CCW: a. Check for annunciators on XCP-601, 602, and 603. b. REFER TO the appropriate ARPs. c. Attempt to correct the cause for loss of CCW.
IOA	RO	Establish either train of CCW as the Active Loop. REFER TO * SOP-118, COMPONENT COOLING WATER. **(CANNOT)**
*	RO	Verify CCW cooling is available to each running Charging Pump. **(NO)**
	RO	Initiate Attachment 1, Charging. Pump Temperature Monitoring, Page 4 of 4.

Booth Operator Instructions:
When called to monitor A charging pump temperatures wait 5 min and then report that you are monitoring temperatures.
If asked for temperatures indicate that temperatures are rising but are below maximum values (copy of AOP-118.1 Att. Is in the booth).
ITI17550A CHG/SI PP A GEARBOX LUBE OIL TEMP IND 115-145 MAX 145
ITI07551 PUMP A OIL CLR OUTLET 120-150 MAX 150
ITI07552 THRUST BRG TEMP 130-155 MAX180

	CRS	GO TO Step 4.
	Crew	Check if at least one CCW loop is restored: **(NO)**

Op Test No.:	2011 NRC	Scenario #	3	Event #	6,7, & 8	Page	29 of 54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
	RO	Place any non-running Charging Pump which does NOT have CCW cooling in PULL TO LK NON-A. **(B and C)**
	RO	Close all Letdown Isolation Valves: 1) PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. 2) LCV-459, LTDN LINE ISOL. 3) LCV-460, LTDN LINE ISOL. 4) HCV-142, LTDN FROM RHR.
	Crew	Establish Charging Pump alternate cooling using Chilled Water per Attachment 1.
Booth Operator Instructions: **When called to align chilled water to A charging pump wait 10 minutes and then report that alternate cooling is being supplied.**		
	CRS	Initiate plant shutdown. REFER TO the appropriate GOP.
	CRS	GO TO Step 11.
	Crew	Within 10 minutes Trip the reactor and Enter EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION
Evaluator Note: **The crew will continue with the steps of AOP-118.1 concurrently with the EOP's. The remaining steps for AOP-118.1 can be found at the end of this guide (page 39)**		

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 30 of 54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
IOA	RO	Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.
IOA	BOP	Verify Turbine/Generator Trip: a. Verify all Turbine STM Stop VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.
IOA	BOP	Verify both ESF buses are energized
IOA	RO	Check if SI is actuated: a. Check if either: a. SI ACT status light is bright on XCP-6107 1-1. Or b. Any red first out SI annunciator is lit on XCP-626 top row. b. Actuate SI using either SI ACTUATION Switch
IOA	Crew	Check if SI is required: a. Check if any of the following conditions exist: • PZR pressure less than 1850 psig. OR • RB pressure GREATER THAN 3.6 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline differential pressure GREATER THAN 97 psig. b. Actuate SI using either SI ACTUATION Switch.
	RO	Trip the RCP(s)

Op Test No.:	2011 NRC	Scenario #	3	Event #	6,7, & 8	Page	31	of	54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
	CRS	GO TO EOP-1.1, REACTOR TRIP RECOVERY, Step 1.
	Crew	Announce plant conditions over the page system.
	BOP	Check FW status: • Ensure the FW Flow Control Valves, FCV-478(488)(498), are closed. • Ensure the Main FW Isolation Valves, PVG-1611A(B)(C), are closed. • Ensure the FW Flow Control Bypass Valves, FCV-3321(3331)(3341), are closed.
	BOP	Ensure EFW Pumps are running: 1) Ensure both MD EFW Pumps are running. 2) Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 32 of 54				

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
*	BOP	IF RCS temperature is LESS THAN 557°F AND decreasing, THEN stabilize temperature by performing the following as required: a) Close IPV-2231, MS/PEGGING STM TO DEAERATOR. b) Perform one of the following: • IF Narrow Range SG level is LESS THAN 26% [41%] in all SGs, THEN reduce EFW flow as necessary to stop cooldown while maintaining total EFW flow GREATER THAN 450 gpm. OR • WHEN Narrow Range SG level is GREATER THAN 26% [41%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F. c) COMMENCE ATTACHMENT 1, STEAM VALVE ISOLATION, while continuing with this procedure. d) IF RCS cooldown continues, THEN close: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Determines that IFV03551-EF will not close.

Booth Operator Instructions:
If called to locally throttle 3551 report that it is bound and will not throttle.

	BOP	Ensure the TDEFW pump is running
CRITICAL TASK	BOP	Close the "C" MD FCV or stop the A and B MDEFW pumps prior to overfilling "C" SG

Op Test No.:	2011 NRC	Scenario #	3	Event #	6,7, & 8	Page	33	of	54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior

NOTE - Step 4 **(N/A)**

If a transition is made to AOP-112.2, STEAM GENERATOR TUBE LEAK NOT REQUIRING SI, the steps of EOP-1.1 which do NOT conflict with AOP-112.2 should be completed as time allows.

	CRS	IF EOP-1.0 was entered from AOP-112.2, THEN RETURN TO AOP-112.2, STEAM GENERATOR TUBE LEAK NOT REQUIRING SI, Step 7. **(NO)**
	CRS	GO TO Step 5.
	RO	Verify all Control Rods are fully inserted.
	BOP	Check DA level control: a. Open LCV-3235, DEAER START UP DRAIN CNTRL, as necessary to maintain DA level LESS THAN 10.5 ft as indicated on LI-3135, DEAER STOR TK WR LVL FEET. b. Locally adjust ITV-3062A(B)(C), BD COOLER A(B)(C) CDSTE OUT TEMP, to 90% (XPN-0029, NUCLEAR BLOWDOWN PROCESSING PANEL, AB-436).

Booth Operator Instructions:
When called to adjust 3062A(B)(C) to 90% closed use trigger 9 to do so.
VLV-CO015P, ITV03062A-CO SG BD HX TR A TMP CTRL FAIL POSITION
VLV-CO016P, ITV03062B-CO SG BD HX TR B TMP CTRL FAIL POSITION
VLV-CO017P, ITV03062C-CO SG BD HX TR C TMP CTRL FAIL POSITION

	RO	Check PZR level control: a. Verify PZR level is GREATER THAN 17%. b. Verify Charging and Letdown are in service. c. Verify PZR level is trending to 25%.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 34 of 54
Event Description:	Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)		

Time	Position	Applicant's Actions or Behavior
	RO	Verify PZR pressure is GREATER THAN 1850 psig.
	RO	Verify PZR pressure is stable at OR trending to 2235 psig (2220 psig to 2250 psig).
	BOP	Verify Narrow Range level in all SGs is GREATER THAN 26%.
	BOP	Control EFW flow to maintain Narrow Range SG level between 40% and 60%.
*	BOP	Verify all AC buses are energized by offsite power: • ESF AC buses • BOP AC buses.
	BOP	Verify PERMISV C-9 status light is bright on XCP-6114 1-3.
	BOP	WHEN RCS Tavg is LESS THAN P-12 (552°F), THEN place both STM DUMP INTERLOCK Switches to BYP INTLK.
	BOP	Verify the MS Isolation Valves, PVM-2801A(B)(C), are open.
	BOP	Place the STM DUMP CNTRL Controller in MAN and closed.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 35 of 54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure the STM DUMP CNTRL Controller is set to 8.4.
	BOP	Place the STM DUMP MODE SELECT Switch in STM PRESS.
	BOP	Place the STM DUMP CNTRL Controller in AUTO.

NOTE - Step 12

- Priority should be given to running RCP A to supply Normal PZR Spray.
- Since a time lag is expected after increasing steam flow before natural circulation parameters can be verified, this procedure should be continued concurrently with the establishment of natural circulation.

	RO	Verify RCP A is running. **(NO)**
	RO	Try to start RCP(s) for Normal PZR Spray: IF no RCP can be started, THEN verify natural circulation from trended values: • RCS subcooling on TI-499A(B), A(B) TEMP "F, is GREATER THAN 30°F. • SG pressures are stable OR decreasing. • RCS Thot is stable OR decreasing. • RCS Tcold is at saturation for the current SG pressure. • Core exit TC temperatures are stable OR decreasing. IF natural circulation can NOT be verified, THEN increase dumping steam.

Evaluator Note:
The above step is written as if CCW is not yet restored. When CCW is restored the actions of AOP-118.1, TOTAL LOSS OF COMPONENT COOLING WATER Attachment 4 would be used to restore RCP operation.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 36 of 54

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior
	RO	Check the position of NR-45, NIS RECORDER: a. Verify Intermediate Range Power is LESS THAN P-6 (7.5x10-6%). b. Transfer NR-45, NIS RECORDER, to both Source Range channels. c. Initiate GTP-702, Attachment VI.KK.

Booth Operator Instructions:
When called to calibrate the high flux at shutdown alarm (GTP-702, Attachment VI.KK) report that you are working on it.

Evaluator Note:
The above step is written as if power is already below P-6. If power is not below P-6 then the crew will continue with the procedure and complete the step when power does drop below P-6.

Time	Position	Applicant's Actions or Behavior
	BOP	Shut down and stabilize the Secondary Plant. REFER TO AOP-214.1, TURBINE TRIP.
		Maintain stable plant conditions: a. Maintain PZR pressure at 2235 psig (2220 psig to 2250 psig). b. Maintain PZR level at 25%. c. Maintain Narrow Range SG levels between 40% and 60%. d. Maintain RCS temperature: • With any RCP running, Tavg at 557°F. OR • With no RCP running, Tcold at 557°F. e. REFER TO GOP-5, REACTOR SHUTDOWN FROM STARTUP TO HOT STANDBY (MODE 2 TO MODE 3).
		COMPLETE Attachment I of SAP-116, PLANT TRIP/SAFETY INJECTION PLANT RECOVERY.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7, & 8	Page 37 of 54				

Event Description: Total loss of CCW. Trip reactor and reactor coolant pumps due to loss of CCW, FCV 3551 MDEFW to C SG fails as is (open)

Time	Position	Applicant's Actions or Behavior

NOTE - Step 17

If no BOP bus is energized:

- A natural circulation cooldown should NOT be initiated unless required by Tech Specs, for plant safety, or CST level decreases to LESS THAN 14.5 ft.
- The System Controller should be notified of plant conditions to determine the expected duration of the power outage.

Time	Position	Applicant's Actions or Behavior
	Crew	Determine if natural circulation cooldown is required: a. All RCPs are stopped. **(YES)** b. CST level is LESS THAN 14.5 ft. **(NO)**
	Crew	Notify the Management Duty Supervisor of plant conditions and request direction.

Booth Operator Instructions:
When contacted as MDS ask for crew's recommended course of action and concur with it.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7,8	Page 38 of 54
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open		

Time	Position	Applicant's Actions or Behavior
The following actions are from AOP-118.1 after the reactor trip they would be done in conjunction with the EOP steps.		
	RO	Isolate Charging and Letdown: a. Close all Letdown Isolation Valves: 1) PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. 2) LCV-459, LTDN LINE ISOL. 3) LCV-460, LTDN LINE ISOL. 4) HCV-142, LTDN FROM RHR. b. Close FCV-122, CHG FLOW.
	RO	Isolate RCP Seals: a. Close MVT-8100, SEAL WTR RTN ISOL. b. Close MVT-8105, SEAL WTR INJ ISOL. c. Close MVG-9606, FROM RB LOAD ISOL (ORB).
	Crew	WHEN cooling is established to any Charging Pump, THEN REFER TO ATTACHMENT 4, STARTING A CHARGING PUMP AND SUPPLYING RCP SEAL COOLING, to start the Charging Pump and supply RCP Seal cooling.
CAUTION RCPs should NOT be restarted prior to an Engineering evaluation, to prevent RCP Seal failure.		
Booth Operator Instructions: **When called to evaluate the ability to supply CCW to the seals and restart the RCP report that seal injection should not reestablished and that attachment 4 of AOP-118.1 should not be completed.**		

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7,8	Page 39 of 54				
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open						

Time	Position	Applicant's Actions or Behavior
		CAUTION - Step 15 RHR Pumps should NOT be run longer than 90 minutes without CCW flow to the RHR Heat Exchangers, to prevent RHR Pump damage.
	Crew	Check if the RHR System is operating. **(NO)**
	CRS	GO TO Step 19.
	Crew	Monitor other CCW System loads: a. Monitor the temperatures of other operating components cooled by the CCW System: • Spent Fuel Pool. • RCDT. • Waste Gas Compressors. • Hydrogen Recombiners. • Sample Coolers. • Recycle Evaporator. • Waste Evaporator. • Excess Letdown Heat Exchanger. b. At Shift Supervisor discretion, remove loads from service as necessary to prevent equipment damage. REFER TO the appropriate system SOPs.
	Crew	Check if at least one CCW loop is restored: **(NO)**
	Crew	Continue efforts to restore at least one CCW loop.
	Crew	Consult Plant Management for further direction.

Op Test No.:	2011 NRC	Scenario #	3	Event #	6,7,8	Page	40 of 54
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open						

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When called to give direction for AOP-118.1 report that CCW should be returned to service in accordance with SOP-118 and that all loads should be restored to service except for RCP thermal barriers so that a bubble is not formed in CCW and that normal charging and letdown should be returned to service in accordance with SOP-102.**		
Evaluator Note: **At this point AOP-118.1 loops back on itself but direction was given by management in the previous Booth Operator Instruction.**		
	RO	Place XPP-58A(B)(C), CCBP A(B)(C), standby pump in OFF.
	RO	Ensure MVB-9503A, CC TO RHR HX A, is open.
CRITICAL TASK	RO	Start one of the following in slow speed: (PEER ✓) 1) XPP-0001A, PUMP A. Prior to establishing Letdown.
CAUTION 2.3.c and 2.3.d Failure to complete Step 2.3.d in a timely manner after reducing RHR Heat Exchanger flow will result in a loss of flow through the running CCW Pump or excessive flow perturbations in the CCW non-essential loop.		
	RO	Start MVB-9503A, CC TO RHR HX A, stroking in the closed direction.(PEER ✓)

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7,8	Page 41 of 54
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open		

Time	Position	Applicant's Actions or Behavior
	RO	When flow, as indicated on FI-7034, HX A FLOW GPM, is between 5000 gpm and 4000 gpm, perform the following in rapid succession: 1) Open MVB-9687A/9525A, LP A NON-ESSEN LOAD ISOL. 2) Open MVB-9524A/9526A, LP A NON-ESSEN LOAD ISOL. 3) Close MVB-9524B/9526B, LP B NON-ESSEN LOAD ISOL. 4) Close MVB-9687B/9525B, LP B NON-ESSEN LOAD ISOL. 5) Open MVB-9503B, CC TO RHR HX B.
	Crew	Locally verify greater than 1 gpm sample flow on RML0002A, LIQUID RAD MON COMPONENT COOLING (IB-412).
Booth Operator Instructions: **When called to verify flow on RM-L2 report that it is >5gpm.**		
	RO	Ensure the following valves have not automatically closed due to high flow: 1) MVG-9625, CC TO RB. 2) MVG-9626, CC TO RB. 3) MVG-9583, FROM XS LTDN HX. 4) MVT-9593A(B)(C), FROM RCP A(B)(C) THERM BARR.
	RO	Transfer the in-service Charging Pump to Train A per SOP-102.
Evaluator Note: **The crew may at this point decide to valve CCW back to cooling the A Charging pump.**		
Booth Operator Instructions: **If asked to return normal cooling to Charging pump tell them that you will return the system to prevent status by using the return as found on Attachment 1A**		

Op Test No.:	2011 NRC	Scenario #	3	Event #	6,7,8	Page	42 of 54
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open						

Time	Position	Applicant's Actions or Behavior
	RO	Ensure XPP-58A(B)(C), CCBP A(B)(C) are aligned as follows (MCB): 1) One pump is in AUTO and operating. 2) One pump is in AUTO and not operating. 3) One pump is in OFF.
Evaluator Note: **The following steps return normal charging and letdown to service.**		
		Place FCV-122, CHG FLOW, in MAN and close.
		Place PCV-145, LO PRESS LTDN, in MAN and open to 70%. (PEER ✓)
		Place TCV-144, CC TO LTDN HX, in MAN and open to 100%.
		Place TCV-143, LTDN TO VCT OR DEMIN, in VCT.
		Open PVT-8152, LTDN LINE ISOL.
		Open the following: a. LCV-459, LTDN LINE ISOL. b. LCV-460, LTDN LINE ISOL.
		Ensure the following Charging Line Isolation Valves are open: a. MVG-8107, CHG LINE ISOL. b. MVG-8108, CHG LINE ISOL.

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7,8	Page 43 of 54
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open		

Time	Position	Applicant's Actions or Behavior
		Slowly open FCV-122, CHG FLOW, to establish 60 gpm flow as indicated on FI-122A, CHG FLOW GPM.
		Open Orifice Isolation Valves to obtain the desired Letdown flow rate (60 gpm to 120 gpm): a. PVT-8149A, LTDN ORIFICE A ISOL (45 gpm). b. PVT-8149B, LTDN ORIFICE B ISOL (60 gpm). c. PVT-8149C, LTDN ORIFICE C ISOL (60 gpm).
		Adjust FCV-122, CHG FLOW, as required to maintain TI-140, REGEN HX OUT TEMP °F, between 250°F and 350°F while maintaining Pressurizer level.
		Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig.
		Place PCV-145, LO PRESS LTDN, in AUTO.
		Adjust TCV-144, CC TO LTDN HX, potentiometer as necessary to maintain the desired VCT temperature and place in AUTO. Refer to VCS Curve Book, Figure VII.15.
		When Pressurizer level is within 1% of and trending to programmed level, place the PZR LEVEL MASTER CONTROL in MAN.
		Establish automatic FCV-122, CHG FLOW, control as follows: a. Determine the correct PZR LEVEL MASTER CONTROL setpoint by dividing the current Charging flow by 1.5. b. Manually adjust the PZR LEVEL MASTER CONTROL to this setpoint. c. Place FCV-122, CHG FLOW, in AUTO. (PEER ✓)

Op Test No.: 2011 NRC	Scenario # 3	Event # 6,7,8	Page 44 of 54
Event Description:	Loss of all CCW forces Rx trip, Emergency FW FCV fails open		

Time	Position	Applicant's Actions or Behavior
		Adjust PZR LEVEL MASTER CONTROL in MAN, as necessary, to maintain Pressurizer level at or near programmed level.
		When Pressurizer level is within 1% of and trending to programmed level, place PZR LEVEL MASTER CONTROL in AUTO. (PEER ✓)
		Monitor LR-459, PZR % LEVEL & LEVEL SP, recorder to verify that Charging flow is maintaining actual Pressurizer level at or near the programmed setpoint.
		After the Letdown temperatures have stabilized, place TCV-143, LTDN TO VCT OR DEMIN, in DEMIN/AUTO.

After letdown is established, the lead evaluator can cue the Safety Valve failure

Op Test No.:	2011 NRC	Scenario #	3	Event #	9	Page	45	of 54
Event Description:		PZR safety valve fails open						

Time	Position	Applicant's Actions or Behavior
Booth operator; when directed activate trigger 7		
	RO	Reports rapidly lowering RCS Pressure/AUTO SI.
	CRS	Returns to EOP-1.0.

Evaluator's Note: **The EOP-1.0 Reference Page Criteria that applies in this scenario is:**

RCP TRIP CRITERIA

- **IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs.**
- **IF both of the following conditions occur, THEN trip all RCPs:**
  - **SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM AND RCS Wide Range pressure is LESS THAN 1400 psig.**

REDUCING CONTROL ROOM EMERGENCY VENTILATION

- **Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.**

Evaluator's Note: **Actions for ATTACHMENT 3, SI EQUIPMENT VERIFICATION, are provided on the final 3 pages of this scenario guide. There is a critical task to close at least one Phase "A" Isolation Valve in two lines that have not properly isolated.**

- **RB Instrument Air**
- **RCP Seal Water Return**

Time	Position	Applicant's Actions or Behavior
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
	CREW	Reports failure of RHR Pump "A"

Booth Operator's Note:

If dispatched wait 2-3 minutes and then report RHR Pump "A" breaker tripped on overcurrent.

Op Test No.:	2011 NRC	Scenario #	3	Event #	9	Page	46	of	54
Event Description:		PZR safety valve fails open							

Time	Position	Applicant's Actions or Behavior
	CREW	Announce plant conditions over the page system.
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen **(YES)**
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557°F.
		• With no RCP running, RCS Tcold is stable at OR trending to 557°F. **(NO)**
	BOP	IF RCS temperature is LESS THAN 557 °F AND decreasing, THEN stabilize temperature by performing the following as required:
		• Close IPV-2231, MS/PEGGING STM TO DEAERATOR.
		• Perform one of the following:
		• IF Narrow Range SG level is LESS THAN 26% [41%] in all SGs, THEN reduce EFW flow as necessary to stop cooldown, while maintaining total EFW flow GREATER THAN 450 gpm. OR
		• WHEN Narrow Range SG level is GREATER THAN 26% [41%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F.
		• COMMENCE ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure.
		• IF RCS cooldown continues, THEN close:
		• MS Isolation Valves, PVM-2801A(B)(C).
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
	RO	Check PZR PORVs and Spray Valves:
		• PZR PORVs are closed. **(YES)**
		• PZR Spray Valves are closed. **(YES)**

Op Test No.:	2011 NRC	Scenario #	3	Event #	9	Page	47	of	54
Event Description:		PZR safety valve fails open							

Time	Position	Applicant's Actions or Behavior
		• Verify power is available to at least one PZR PORV Block Valve: **(YES)**
		• MVG-8000A, RELIEF 445 A ISOL.
		• MVG-8000B, RELIEF 444 B ISOL
		• MVG-8000C, RELIEF 445 B ISOL.
		• Verify at least one PZR PORV Block Valve is open. **(YES)**
Procedure Note:		**Seal Injection flow should be maintained to all RCPs.**
	RO	Check if RCPs should be stopped:
	BOP	Verify no SG is FAULTED:
		• No SG pressure is decreasing in an uncontrolled manner. **(YES)**
		• No SG is completely depressurized. **(YES)**
	CREW	Verify Secondary radiation levels indicate SG tubes are NOT RUPTURED: (**YES** to all)
		• RM-G19A (B) (C) STMLN HI RNG GAMMA
		• RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR.
		• RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR.
		• RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR.
	RO	Check if the RCS is INTACT: (**NO** to any or all)
		• RB radiation levels are normal on:
		• RM-G7, CONTAINMENT HI RNG GAMMA
		• RM-G18, CNTMNT HI RNG GAMMA.
		• RB Sump levels are normal.
		• RB pressure is LESS THAN 1.5 psig.
		• The following annunciators are NOT lit:
		• XCP-606 2-2 (RBCU 1A/2A DRN FLO HI)

Op Test No.:	2011 NRC	Scenario #	3	Event #	9	Page	48 of 54
Event Description:		PZR safety valve fails open					

Time	Position	Applicant's Actions or Behavior
		• XCP-607 2-2 (RBCU 1B/2B DRN FLO HI)
	CRS	Transitions to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT.
Procedure Notes:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Seal Injection flow should be maintained to all RCPs.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Check if RCPs should be stopped (None running).
	BOP	Verify no SG is FAULTED
		• No SG decreasing in an uncontrolled manner **(YES)**
		• No SG completely depressurized **(YES)**
	BOP	Check Intact SG levels
		• NR level in intact SGs >26% [41%]
		• Control EFW flow to maintain 40-60% NR level
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset Containment Isolation:
		• RESET PHASE A - TRAIN A(B) CNTMT ISOL.
		• RESET PHASE B - TRAIN A(B) CNTMT ISOL.
	RO/BOP	Check if Secondary radiation levels are normal: (**YES** to all)
		• Check radiation levels normal on:
		• RM-G19A(B)(C), STMLN HI RNG GAMMA.

Op Test No.: 2011 NRC	Scenario # 3	Event # 9	Page 49 of 54
Event Description:	PZR safety valve fails open		

Time	Position	Applicant's Actions or Behavior
		• RM-A9, CNDSR EXHAUST GAS ' ATMOS MONITOR.
		• RM-L3, STEAM GENERATOR ' BLOWDOWN LIQUID MONITOR.
		• RM-L10, SG BLOWDOWN CW ' DISCHARGE LIQUID MONITOR.
		• Place SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL, in AUTO.
		• Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.
	RO	Check PZR PORVs and Block Valves:
		• Verify power is available to the PZR PORV Block Valves:
		• MVG-8000A, B, C **(YES)**
		• Verify all PZR PORVs are closed. **(YES)**
		• Verify at least one PZR PORV Block Valve is open. **(YES)**
	RO/BOP	Place both ESF LOADING SEQ A(B) RESETS to:
		• NON-ESF LCKOUTS
		• AUTO-START BLOCKS
	RO	Establish Instrument Air to the RB:
		• Start one Instrument Air Compressor and place the other in Standby.
		• Open PVA-2659, INST AIR TO RB AIR SERV.
		• Open PVT-2660, AIR SPLY TO RB.
	RO	Check if SI flow should be reduced:
		• RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 52.5 °F. **(NO)**
	CRS	GO TO Step 11.

Op Test No.:	2011 NRC	Scenario #	3	Event #	9	Page	50 of 54
Event Description:		PZR safety valve fails open					

Time	Position	Applicant's Actions or Behavior
	RO	Check if RB Spray should be stopped:
		• Check if any RB Spray Pumps are running. **(NO)**
	CRS	GO TO Step 12. Observe the CAUTION prior to Step 12.
	RO	Check if RHR Pumps should be stopped: (**YES**)
		• Stops any running RHR pump
	RO	Check if RCS pressure is stable or decreasing. **(YES)**
	BOP	Check if pressure in all SGs is stable or increasing. **(YES)**
	BOP	Check if DGs should be stopped:
		• Verify both ESF buses are energized by offsite power. **(YES)**
		• Stop any unloaded DG. REFER TO SOP-306, EMERGENCY DIESEL GENERATOR.
	RO	Verify equipment is available for Cold Leg Recirculation:
		• Verify power is available for at least one RHR Pump: (**YES**)
		• Open both MVB-9503A(B), CC TO RHR HX A(B).
Caution step 16.c:		• **If the swing CCW Pump is NOT available, the running pump should NOT be secured to shift it to fast speed, to prevent damage to the Charging Pump on that train.**
		• Leaves the one running CCW in SLOW speed
	RO	Check the AB for evidence of ECCS leakage (**NO**)
	RO	Obtain necessary chemistry samples
	RO	Shutdown and stabilize the Secondary Plant

Op Test No.: 2011 NRC	Scenario # 3	Event # 9	Page 51 of 54
Event Description:	PZR safety valve fails open		

Time	Position	Applicant's Actions or Behavior
	RO	Check If RCS Cooldown and Depressurization is required (**YES)**
		• RCS pressure greater than 325 psig (**YES)**
	CRS	GO TO EOP-2.1 POST-LOCA COOLDOWN AND DEPRESSURIZATION.
Evaluator's Note; Scenario may be terminated after transition to EOP-2.1		

Op Test No.: 2011 NRC	Scenario # 3 Event # 9	Page 52 of 54
Event Description:	PZR Safety valve fails open	
Time	Position	Applicant's Actions or Behavior

EOP-1.0, ATTACHMENT 3

Evaluator Note:

- **No ESF actuations will have occurred.**
- **All valves and fans must be manually started, all valves and dampers manually aligned.**
- **There is a critical task for manually aligning SI.**

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW pumps are running. (NO, "A" is failed)
		• Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Ensure the following EFW valves are open:
		• FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C).
		• FCV-3536(3546)(3556), TD EFP TO SG A(B)(C)
		• MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm. **(YES)**
	BOP	Ensure FW Isolation:
		• Ensure the following are closed:
		• FW Flow Control
		• FW Isolation, PVG-1611A(B)(C).
		• FW Flow Control Bypass, FCV-3321(3331)(3341).
		• SG Blowdown, PVG-503A(B)(C).
		• SG Sample, SVX-9398A(B)(C).
		• Ensure all Main FW Pumps are tripped.
		Ensure SI Pumps are running:

Op Test No.: 2011 NRC	Scenario # 3	Event # 9	Page 53 of 54
Event Description:	PZR Safety valve fails open		

Time	Position	Applicant's Actions or Behavior
		• Two Charging Pumps are running.
		• Both RHR Pumps are running. (NO – "A" is failed and "B" may trip before Attachment 3 is completed)
	BOP	Ensure two RBCU Fans are running in slow speed (one per train).
	BOP	Verify Service Water to the RBCUs:
		• Ensure two Service Water Pumps are running.
		• Ensure both Service Water Booster Pumps A(B) are running.
		• Verify GREATER THAN 2000 gpm flow for each train on:
		• FI-4466, SWBP A DISCH FLOW GPM.
		• FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running.
	BOP	Ensure two Chilled Water Pumps and Chillers are running.
	BOP	Check if Main Steamlines should be isolated: **(NO)**
		• Check if any of the following conditions are met:
		• RB pressure GREATER THAN 6.35 psig. OR
		• Steamline pressure LESS THAN 675 psig. OR
		• Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F.
		• Ensure ALL the following are closed:
		• MS Isolation Valves, PVM-2801A(B)(C).
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Ensure Excess Letdown Isolation Valves are closed:
		• PVT-8153, XS LTDN ISOL.

Op Test No.:	2011 NRC	Scenario #	3	Event #	9	Page	54	of	54
Event Description:	PZR Safety valve fails open								

Time	Position	Applicant's Actions or Behavior
		• PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106.
		REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
CRITICAL TASK		**Closes at least one valve in each of the following pairs:**
		• **8100 AND/OR 8112, RCP Seal Water Return Isolations**
		• **2662A AND/OR 2662B, RB Instrument Air Isolations**
	BOP	Verify proper SI alignment:
		• Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104.
		• Verify all SAFETY INJECTION monitor lights are dim on XCP-6106.
		• Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM.
		• Check if RCS pressure is LESS THAN 250 psig. **(NO)**
		• Verify RHR flow on: (No pumps running).

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: ____________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 25% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2) / / B1 Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	Raising power GOP 4A , step 3.12C	
	Operations scheduled for oncoming shifts:	
	Continue power escalation	
	Plant safeguard systems in degraded status:	
	"B" EDG LOTO, XPP0038 "B" RB Sprat Pump LOTO.	
		Initials
	In the Control Room, all books are replaced, the desk and console tops are clear, and all trash is properly disposed of.	
	Station Log completed.	

Oncoming Control Room Supervisor			Initials
Oncoming watch has reviewed the VCS Switchgear mailbox for switching orders.			
Plant Status (to be completed prior to turnover):			
	Plant ESF System Status:		
	Component Cooling System		
	Service water System		
	Reactor Building Cooling System		
	Reactor Building Spray System		
	Accumulator Tanks		
	RHR System		
	Charging/Safety Injection System		
	Emergency Feedwater System		
	Diesel Generator		
	Chilled Water System		
	Control Room Ventilation System		
	Position indications, power availability, and annunciator alarms are normal for present plant conditions.		
	Plant Parameters	Limit	
	Reactor Power	0-100%	
	RCS Tavg	≤589.2°F per loop	
	RCS Pressure	<2385 psig	
	RCS Flow	>100% per loop	
	RCS Subcooling	Normal	
All parameters within allowable limits for plant conditions. If not, what actions are being taken to correct conditions:			
	Review of Logs:		
	Station Log		
	Removal and Restoration Log		
	Tagout Log		
	Special Orders		
Shift Turnover (to be completed during turnover):			
	Briefing on plant conditions by offgoing Control Room Supervisor.		
	Review of SPDS and BISI displays.		
	Identification of in-progress procedures including their present status and locations.		

CHG C

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Control Room Supervisor	
	Offgoing Control Room Supervisor	
	Shift Supervisor review	

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 25% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2- Thumderstorms) // B1 Maintenance
Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in
3 hours

Offgoing Reactor Operator	Initials
Main Control Board (Reactor Operator portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Reactor Operator area of responsibility.	

Oncoming Reactor Operator	Initials
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	

System Alignment	A	B	C	Train aligned to	Reasons for any inoperable equipment
Service Water Pumps	X	X		A	
Component Cooling Pumps	X			A	
Charging Pumps	X			A	
HVAC Chillers	X			A	
Reactor Building Spray Pumps					
RHR Pumps					
			TDEFP		
Emergency Feedwater Pumps					
Inoperable Radiation Monitors					

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Reactor Operator	
	Offgoing Reactor Operator	
	Shift Supervisor review	

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 25% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x2- Thumderstorms) / / B1 Maintenance Week
~~XPP0038B B RB Spray Pump RTO/LOTO~~
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Balance Of Plant	Initials
Main Control Board (Balance Of Plant portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Balance Of Plant area of responsibility.	

Oncoming Balance Of Plant	Initials
Review of Main Control Room Panels.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Test annunciator lights (with Offgoing operator concurrence).	

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Balance Of Plant	
	Offgoing Balance Of Plant	
	Shift Supervisor review	

Facility: VC SUMMER		Scenario No: Spare	Op Test No.: **2011 NRC**
Examiners: ____		Operators:	CRS
____			RO
____			BOP

Initial Conditions:
- 40% Power, MOL, GOP-4a, Step 3.12L (IC-304 for 2011)
- "B" EDG is OOS to clean the lube oil strainer
- "B" RB spray pump is out of service for bearing replacement
- National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area

Turnover:
- Raise power to 100%

Critical Task:
- Actuate SI manually prior to exiting EOP-1.0 (E-0)
- Actuate one train of Control Room emergency Ventilation prior to exiting EOP-1.0 (E-0)

Event No.	Malf. No.	Event Type*	Event Description
1	ANN-EM008	C-BOP, CRS	High temperature on Transformer 1A1 requires transfer of 480V busses 1A1 and 1A2 to alternate power . BOP-1
2	CRF004L11	C-RO, CRS TS-CRS	Dropped control rod RO-2
	N/A	N-BOP, CRS R-RO,	Decrease power to recover rod
3	CNH-FW002O	C-BOP, CRS	FW Bypass valve fails open. BOP-2
4	MAL-PRS001A	I-RO, CRS	PT-444 fails high RO-3
5	PMP-CS004B	C-RO, CRS TS-CRS	Running charging pump bearing seizes RO-1
6	VLV-RH007L VLV-RH009L FLX-RHR001	M-ALL	Non isolable LOCA outside containment
7	MAL-PCS005A MAL-PCS005B	C-ALL	Failure of SI to auto-initiate.
8	PMP-AH022F and AH023F	C-BOP	Failure of XFN-30A,B, EMERG FLTR FAN A,B to start.
*	(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor		

DRAFT

The crew will assume the watch having pre-briefed on the Initial Conditions..

A high temperature alarm is received on the 1A1 transformer. Busses 1A1 and 1A2 must be transferred to alternate power. BOP determines that a fault does not exist on the bus and energizes 1A1 and 1A2 by using the tie breakers (tie breakers need to be pulled up to operate). The 1A1-1A2 feeder breaker must be manually opened to deenergize the transformer; if it is opened prior to closing the tie breaker a loss of power to 1A1 and 1A2 will occur: a trouble alarm for the B IA compressor would be received: it clears when power is reestablished. HVAC alarms would indicate that XFN-17A, XFN-24A, XFN-15 and XFN-24 all tripped (AB ventilation is secured). The crew directs the control building operator to reestablish AB ventilation if it is lost. It is important to reestablish AB ventilation to be able to detect the LOCA outside containment later in the scenario. XCP-632,3-3 GEN AUX PNL TRBL, is also received due to a loss of power to the running stator water cooling pump. The turbine building operator reports that the cause of the alarm is XPN-7201 5-2, RESERVE PUMP RUNNING/PULL TO LOCK: the standby stator pump started with normal flow and pressure. The loss of power also affects exhaust hood spray pump A and vacuum pump C but since those pumps are not running no actions are necessary.

Control rod L-11 drops into the core. AOP-403.6, DROPPED CONTROL ROD is entered and RX engineering requests that rod recovery occur at 40% power. Crew reduces power with rods in manual. CRS refers to TS 3.1.1.1, 3.1.3.1, 3.1.3.6, 3.2.4.. 3.1.1.1 is Shutdown margin: STP 134.001 states that SDM is assumed due to cycle design and a SDM calculation is not required. 3.1.3.1 is Group height +/- 12 steps, action d.3 requires reevaluation within 5 days, SDM verification, power distribution monitoring, and thermal power reduction to <75% and high flux trip setpoint reduction to 85% within 4 hours. 3.1.3.6 is RIL and makes the misaligned rod be brought up to the bank (precludes the insertion of the bank to pick up the rod). 3.2.4 is QPTR and requires that the QPTR be in limits above 50% (not applicable since below 50%). Rod will not be recovered.

FW Bypass valve to A SG fails open increasing flow to A SG. BOP should take manual control of feed regulating valve and control level per the ARP to avoid the requirement for manual Reactor trip at 75% level.

While power is being decreased, PT-444 fails high. This causes PCV-444B, PWR RELIEF, (Pressurizer PORV) to open as well as the PZR sprays to open. This is ramped to give the RO time to diagnose the failure while conducting task of down power. The crew enters AOP-401.5, PRESSURIZER PRESSURE CONTROL CHANNEL FAILURE, to regain control of pressure. If primary pressure goes below 2206 psig, the CRS will enter TS 3.2.5 POWER DISTRIBUTION LIMITS: DNB PARAMETERS.

The A charging pump bearing gradually seizes, permitting either a manual trip or automatic trip on overcurrent. Damage to the A charging pump may cause the crew to enter TS 3.5.2 for a loss of a ECCS system until the C pump is racked up on A train and the A charging pump is racked down. The crew will use AOP-102.2, LOSS OF CHARGING, to reestablish charging and letdown.

During the down power the plant experiences a LOCA outside containment due to leaking inlet valves from the RCS loops to RHR (8701A and 8702A) the increased pressure causes a flex leak on the inlet to the A RHR pump. The crew will go through AOP-101.1, LOSS OF REACTOR COOLANT NOT REQUIRING SI and determine that an SI is required. A critical task will be for the crew to actuate SI prior to exiting EOP-1.0 (E-0). The crew will go through EOP 1.0 (E-0) and determine that the RCS leak is outside of containment and transition to EOP-2.5 (ECA-1.2). In EOP-1.0(E-0) the BOP will discover that neither CB emergency filter fans started as required and will start at least one of the fans; starting one train is critical to limit control room dose during a LOCA outside Containment. The crew will attempt to isolate the leak but will be unsuccessful and transition to EOP-2.4 (ECA-1.1). Makeup water to the RWST is added to prolong its use. Safety injection will be reduced to preserve RWST level but still cool the core and the RCS will depressurized to limit break flow. The scenario can be terminated when SI flow is reduced to one train.

VCS 2011 NRC Spare Scenario Simulator Setup (SNAP 304)

Initial Conditions:

- 40% Power, MOL, GOP-4a, Step 3.16
- Prior to the scenario, crew should pre-brief on conditions and expectations for the Shift (maintain power, repairs estimated to be complete well before LCO action time expires.
- Conduct two-minute drill
- Mark up procedures in use with "Circle and slash" as applicable

Pre-Exercise:

Ensure simulator has been checked for hardware problems (DORT, burnt out light bulbs, switch malfunctions, chart recorders, etc.)

TQP-801 Booth Operator checklist, has been completed

Hang Red Tags for equipment out of service

PRE-LOAD

- LOA AUX 118 = RACK OUT "B" RB Spray pump breaker
- LOA-EPS114 = MAINTENANCE ("B" EDG OOS)
- MAL PCS005A SAFETY INJECTION FAILURE TRAIN A = FAIL TO AUTO INIT
- MAL PCS005B SAFETY INJECTION FAILURE TRAIN B = FAIL TO AUTO INIT
- MAL PMP-AH022F CNTRL ROOM EMERG FAN A FAIL TO START
- MAL PMP-AH023F CNTRL ROOM EMERG FAN B FAIL TO START
- OVR RH017B, 018B, and RH007 = OFF/FALSE (keeps RHR valve red lights off)

Trigger 1: Loss of 480VAC bus 1A1

- Insert ANN-EM008 XFMR XTF-1A1 HIGH TEMP = ON

Trigger 2: Dropped control rod

- Malfunction CRF004L11 DROPPED ROD L11 = Stationary
- Power reduction to recover rod

Trigger 3: Feedwater bypass flow control valve fails open

- Malfunction CNH-FW002O FW BYPASS VALVE FV-3321 FAILURE =100%, 90 sec ramp

Trigger 4: Master PZR pressure PT-444 fails high

- Malfunction PRS001A PRESSURIZER PRESSURE CHANNEL 444 FAILURE = 2500#, 30 second ramp

Trigger 5: A charging pump bearing seizes leading to trip

- Malfunction PMP-CS004B severity 10, 5 minute ramp.

Trigger 6: LOCA outside containment

- Malfunction VLV-RH007L XVG08701A-RH RHR PMP A INLET ISO VLV LEAKAGE = 10%
- Malfunction VLV-RH009L XVG08702A-RH RHR PMP A INLET ISO VLV LEAKAGE = 10%
- Malfunction FLX-RHR001 FLEX LEAK RHR PP A SUCT = 500 gpm, 3 minute Time Delay

Trigger 7: rack up C charging pump (when directed by crew)

- LOA-CVC043 CHARGING PUMP C SUPPLY BRKR TRAIN A = RACK IN
- LOA-CVC041 CHARGING PUMP C SUPPLY BRKR TRAIN B = RACK OUT

Trigger 8: Restart of AB ventilation system (if directed by crew)

- OVR-AH058E SS-AH011 A.B. HEPA EXH FAN(XFN-24A-AH) SWITCH = True
- OVR-AH045C CS-AH005 A.B. MAIN SUPPLY FAN(XFN-15A-AH) = True
- OVR-AH046C CS-AH005 A.B. MAIN SUPPLY FAN(XFN-17A-AH) = True
- OVR-AH053E SS-AH173 F.H.B. SUPPLY FAN(XFN-20-AH) ST= True

Trigger 9: Match flags on Stator Water cooling

- LOA-TUR015 Stator Water cooling pump A to OFF
- LOA-TUR016 Stator Water cooling pump B to ON

Trigger 10; Energize RHR Loop A suction valves

- LOA RHR009 (8701A, 1DA2X) and LOA RHR011 (8702A, 1DB2Y) = CLOSE

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	1	Page 6	of 45

Event Description: High temperature on BOP transformer XTF-1A1 requires transfer of BOP loads

Time	Position	Applicant's Actions or Behavior

Booth Instructor:

When directed, activate trigger 1

Indications available:

Electrical panel alarm XCP-634 Point 1-1 XFMR XTF 1A1 HIGH TEMP lit

Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledges alarm and opens Annunciator Response procedure.
	BOP	Directs TB operator to investigate transformer XTF-1A1

Booth Instructor: when contacted as Turbine Building operator, report XTF-1A1 winding temperatures indicate 200°Centigrade, smell of hot insulation, NO FIRE at XTF-1A1

Time	Position	Applicant's Actions or Behavior
	BOP	Determines that a fault does not exist on either buss and energizes 1A1 and 1A2 by using the tie breakers (Tie breaker switches need to be pulled up to operate).
	BOP	Manually trips the XTF 1A1-1A2 feeder breaker.
	Crew	Notifies Electrical Maintenance of failure

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	1	Page	7 of 45

Event Description: High temperature on BOP transformer XTF-1A1 requires transfer of BOP loads

Time	Position	Applicant's Actions or Behavior

Evaluator's note; if tie breakers are closed prior to opening 7.2KV transformer feeder breaker, no loads are lost. The following events are included in case the crew decides not to close the tie breakers until the busses have been inspected for excess loads by electrical maintenance.

	BOP	A trouble alarm for the B IA compressor is received: it clears when power is reestablished.
	BOP	HVAC alarms indicate that XFN-17A, XFN-24A, XFN-15 and XFN-24 all tripped (Aux Bldg ventilation is secured). The crew directs the control building operator to reestablish AB ventilation. It is important to reestablish AB ventilation to be able to detect the LOCA outside containment later in the scenario.
	BOP	XCP-632,3-3 GEN AUX PNL TRBL, is also received due to a loss of power to the running stator water cooling pump.

Booth operator instructions; when contacted as the turbine building operator, report standby stator water coolant pump running and use Trigger 9 to match flags and clear alarm

	Crew	Notifies Electrical Maintenance of failure

Booth Operator Instructions: When called respond as EM that the 87 flag is down on phase 1 of XTF1A1 feeder breaker. Light smell of smoke but no fire at XTF-1A1, winding temperatures are higher than last logged readings. EM also reports no visual damage to Switchgear 1A1 or 1A2 busswork, megger test is SAT.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	1	Page	8	of 45

Event Description: High temperature on BOP transformer XTF-1A1 requires transfer of BOP loads

Time	Position	Applicant's Actions or Behavior
	BOP	Directs TB operator to investigate generator aux panel alarm

Booth Operator Instructions: When called as TB operator respond "The turbine building operator reports that the cause of the alarm is XPN-7201 5-2, RESERVE PUMP RUNNING/PULL TO LOCK: the standby stator pump started with normal flow and pressure." **Use Trigger 9 to match flags on stator cooling water pumps.**

Time	Position	Applicant's Actions or Behavior
	Crew	Directs Control Bldg operator to restart AB ventilation

Booth Operator Instructions:

When called as Control Building insert Trigger 8 to restart ventilation systems

At the discretion of the Lead Examiner, proceed to the next event

Op Test No.: 2011 NRC	Scenario # Spare	Event # 2	Page 9 of 45
Event Description:	Dropped control rod		

Time	Position	Applicant's Actions or Behavior

Booth Instructor: when directed activate trigger 2

Indications available:

XCP-621 pt. 3-1 ONE ROD ON BOTTOM

XCP-620 pt. 1-4 PR CHAN DEV

XCP-620 pt. 1-5 PR UP DET FLUX HI DEV AUTO DEFEAT

XCP-620 pt. 1-6 PR LOW DET FLUX HI DEV AUTO DEFEAT

XCP-621 DRPI ALARM NON-URGENT

10% reduction in Power range NI-44 reading

	Crew	Refer to alarm response procedures
		PROBABLE CAUSE: 1. A shutdown or control group rod fails to withdraw. 2. A shutdown or control group rod dropped **(yes)**. 3. DRPI System malfunction. 4. Plant shutdown in progress.
		AUTOMATIC ACTIONS: 1. Possible reactor trip. 2. Automatic outward rod motion to match T_{ave} to T_{ref} until the withdrawal limit is reached.

Op Test No.: 2011 NRC	Scenario # Spare	Event # 2	Page 10 of 45				
Event Description:	Dropped control rod						

Time	Position	Applicant's Actions or Behavior
	CRS	**CORRECTIVE ACTIONS:** 2. If a shutdown or control group rod has dropped and the Reactor did not trip **(yes)**, implement AOP-403.6, Dropped Control Rod.
IOA	RO	Verify only one Control Rod has dropped **(yes).**
IOA	RO	Place ROD CNTRL BANK SEL Switch in MAN.
	Crew	Stabilize the plant; a. Decrease Main Turbine load to maintain T_{avg} within 5°F of T_{ref} . b. Verify PZR pressure is stable or trending to 2235 psig (2220 psig to 2250 psig). c. Verify PZR level is stable at OR trending to program level.
	RO	Check if Reactor power is LESS THAN 75%. **(yes)**
	CRS	Initiate GTP-702, Attachments IV.A, IV.B, and IV.C to monitor Shutdown Margin, rod deviation, and rod insertion.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	2	Page 11	of 45
Event Description:	Dropped control rod						

Time	Position	Applicant's Actions or Behavior
	CRS	Notify the following plant personnel prior to moving Control Rods: Management Duty Supervisor and Rod Control System Engineer.
	CRS	Provide Reactor Engineering with the following information:
	RO	Determine and correct the cause of the failure **(will not be corrected).**
NOTE - Step 9 This Step must be completed before continuing with Step 10.		
	RO	Obtain the following information from Reactor Engineering: Power level at which recovery is to be performed: **(35%)**. Rate of Control Rod movement during recovery: **(4 steps per minute)**.
Booth Operator Instructions: **When called as Reactor Engineering, direct recovery at 35% power, not to exceed 4 steps per minute average.**		

Op Test No.: 2011 NRC	Scenario # Spare	Event # 2	Page 12 of 45				
Event Description:	Dropped control rod						

Time	Position	Applicant's Actions or Behavior
	Crew	**If necessary, reduce Reactor Power to the power level determined in Step 9. REFER TO GOP-4B, POWER OPERATION (MODE 1 - DESCENDING) OR GOP-4C, RAPID POWER REDUCTION.**
Evaluator Note: GOP-4B expected due to small size of power reduction		
NOTE 3.3 Step 3.3 lowers Reactor Power from 48% to 25%.		
	BOP	Reduce load a. De-energize the LOAD LIMIT circuit per SOP-214, Main Turbine and Controls. b. Energize the DEC LOAD RATE circuit. c. Select desired rate on LOAD RATE LMT-% PER MIN. d. Decrease LOAD SET to attain 25% Reactor Power or to the Generator load desired.
	BOP	As load decreases, adjust Megavars using GEN FIELD VOLT ADJ as requested by the Load Dispatcher and within the Estimated Generator Capability curve (Enclosure A).

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	2	Page 13	of 45

Event Description: Dropped control rod

Time	Position	Applicant's Actions or Behavior
	RO	As load decreases, Borate or dilute per SOP-106, Reactor Makeup Water System, to maintain Control Rods above the Rod Insertion Limit **(rods are left in manual, AOP adjusts turbine load to keep Tavg within 5°F of program).**

After a >5% power change, proceed to the next event with Lead Evaluator concurrence.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	3	Page	14	of	45
Event Description:	Bypass Feed Regulating Valve on A SG drifts open								

Time	Position	Applicant's Actions or Behavior
Booth Instructor: **When directed, activate trigger 3**		
Indications available: **XCP-624, 1-4, SG A LVL DEV** **XCP-624, 1-1, SG A LVL HI-HI** **Increasing level on "A" SG.**		
	Crew	Refer to alarm response procedures
		PROBABLE CAUSE: (none apply) 1. Step load increase or decrease. 2. Steam Generator A level control system malfunction. 3. FCV-478, A FCV, malfunction. 4. Testing in progress. 5. Instrument failure.
		AUTOMATIC ACTIONS: 1. FCV-478, A FCV, will modulate to restore level to 61.6%.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	3	Page 15	of 45
Event Description:	Bypass Feed Regulating Valve on A SG drifts open						

Time	Position	Applicant's Actions or Behavior
		CORRECTIVE ACTIONS:
	BOP	1. If required, restore Steam Generator A level to between 60% and 65% by performing the following: a. Manually control PVT-478, SG A FWF
	BOP	2. Evaluate SG A Narrow Range level indicators LI-474, LI-475, and LI-476: a. For increasing level: 1) At 70% Narrow Range level: (a) During startups (below 15% power) close the Feed Regulating valves with the B Train Switches. (b) When above 15% power take manual control of PVT-478, SG A FWF. (c) Ensure Feed Flow is 200 kbh to 400 kbh less than Steam Flow. 2) At 75% Narrow Range level: (a) Trip the Reactor if above 15% power. (b) Close the Feed Isolation valves. (c) Trip the Turbine. (d) Trip the Feed Pumps. (e) Close the Feedwater Regulating valves, if not closed earlier. (f) If the Reactor has <u>NOT</u> been tripped, reduce power to between 1% and 3% at 1% to 2% per minute. (g) Reestablish Emergency Feed.
		SUPPLEMENTAL ACTIONS:
	BOP	1. Correct the level deviation and restore automatic control (**NO**, valve is failed open).

Op Test No.: 2011 NRC	Scenario # Spare	Event # 3	Page 16 of 45
Event Description:	Bypass Feed Regulating Valve on A SG drifts open		

Time	Position	Applicant's Actions or Behavior

Booth Operator Instructions:

When called as I&C report that you will develop a troubleshooting plan.

At the discretion of the Lead Examiner proceed to the next event

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	4	Page	17 of 45
Event Description:	PT-444 fails high						

Time	Position	Applicant's Actions or Behavior

Booth Instructor: When directed, activate trigger 4

Indications available:

XCP-616, 2-5, PZR PCS HI

XCP-616, 2-3, PZR PRESS HI/LO

XCP-616, 2-6, PZR CNTRL PRESS HI

XCP-616, 4-1, PZR SAFETY VLV LINE TEMP HI

XCP-616, 4-2, PZR RLF LINE TEMP HI

XCP-616, 4-3, PZR RLF VLV ISOL

1 PORV and two spray valves open (red lights on, green lights off)

	Crew	Refer to alarm response procedures
	Crew	Refer to XCP-616, 2-5
		PROBABLE CAUSE: 1. Rapid load reduction. 2. Instrument malfunction **(yes)**. 3. Pressure controller failure.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	4	Page	18 of 45
Event Description:	PT-444 fails high						

Time	Position	Applicant's Actions or Behavior
		AUTOMATIC ACTIONS: 1. Pressurizer heaters cut off. 2. PCV-444B, PWR RELIEF, opens. 3. PCV-444C(444D), PZR SPRAY, open fully.
		CORRECTIVE ACTIONS:
	RO	Compare PI-444, CNTL CHN PRESS PSIG, with other Pressurizer pressure indications to determine if IPT00444, PRESSURIZER PRESSURE CONTROL PRESS XMTR, has failed high **(yes)**.
	RO	If IPT00444, PRESSURIZER PRESSURE CONTROL PRESS XMTR, has failed high **(yes)**,perform the following: a. Close PCV-444B, PWR RELIEF. b. Close PCV-444C, PZR SPRAY, and PCV-444D, PZR SPRAY. c. Turn on Pressurizer heaters as necessary to control pressure. d. Place the PZR PRESS MASTER CONTROL in MAN and control pressure manually. e. Refer to AOP-401.5, Pressurizer Pressure Control Channel Failure.
	CRS	Transitions to AOP-401.5, Pressurizer Pressure Control Channel Failure

NOTE: Through this procedure, “AFFECTED” refers to any PZR PORV that has actuated as a result of the instrument failure.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	4	Page	19	of 45
Event Description:	PT-444 fails high							

Time	Position	Applicant's Actions or Behavior
IOA	RO	Verify the PZR PORVs are closed: **(NO)**
IOA	RO	IF PZR pressure is LESS THAN 2300 psig, THEN perform the following: Close the AFFECTED PZR PORV(s): • PCV-445A, PWR RELIEF **(NO)** • PCV-445B, PWR RELIEF **(NO)** • PCV-444B, PWR RELIEF **(YES)**
NOTE – Step 2 PZR PRESS control channels PI-444 and PI-445 connect to the same reference leg line as protection channel PI-457.		
IOA	RO	Compare the PZR control channel indication to the protection channel indications: **(ONLY 444 reading high)** • PI-455, PRESS PSIG • PI-456, PRESS PSIG • PI-457, PRESS PSIG
IOA	RO	Check if PI-444, CNTROL CHAN PRESS PSIG, indication is NORMAL. **(NO)**

Op Test No.: 2011 NRC	Scenario # Spare	Event # 4	Page 20 of 45
Event Description:	PT-444 fails high		

Time	Position	Applicant's Actions or Behavior
IOA	RO	a) Ensure the PZR Spray Valves are closed: • PCV-444C. PZR SPRAY • PCV-444D, PZR SPRAY b) Control PZR PRESS MASTER CONTROL in MAN. c) Operate the PZR Heaters and Spray Valves in manual to control RCS pressure between 2220 psig and 2250 psig. d) Within one hour; close MVG-8000B. RELIEF 444 B ISOL
	RO	Check if PI-445, CNTRL CHAN PRESS PSIG, indication is NORMAL. **(YES)**
	CRS	Determine above action satisfies Technical Specification 3.4.4 Action a. "With one or more PORV(s) inoperable and capable of being manually cycled, within 1 hour: 1) Restore the PORV(s) to OPERABLE status or 2) Close the associated block valve(s) and maintain power to the block valve; otherwise, be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours."
	RO	Ensure ROD CNTRL BANK SEL Switch is in AUTO.
*	RO	Maintain RCS pressure between 2220 psig and 2250 psig.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	4	Page	21	of 45
Event Description:	PT-444 fails high							

Time	Position	Applicant's Actions or Behavior
	CRS	While regaining pressure monitor Technical Specification:3.2.5: Indicated Pressurizer Pressure ≥ 2206 psig Action: With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 4 hours.
	Crew	Determine and correct the cause of the channel failure **(will not be corrected during scenario)**.
Booth Operator Instructions: **When called as I&C report that a troubleshooting plan is being developed.**		
At the discretion of the Lead Examiner, proceed to the next event.		

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	5	Page	22 of 45
Event Description:	Charging pump bearing seizes causing loss of charging						

Time	Position	Applicant's Actions or Behavior
		Booth Instructor: when directed, activate trigger 5.
		Indications available: **XCP-614 5-1, CHG LINE FLO HI/LO** **Charging pump amps increase** **Amber overload light above charging pump control switch**
	Crew	Refer to alarm response procedure
		AUTOMATIC ACTIONS: 1. None.
	RO	**CORRECTIVE ACTIONS:** 1. If the running Charging Pump amps are abnormal **(yes)**, secure the Charging Pump and go to AOP-102.2, Loss of Charging.
	CRS	Enters AOP-102.2, LOSS OF CHARGING
	RO	Checks if charging flow is normal **(NO)**

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	5	Page	23 of 45
Event Description:	Charging pump bearing seizes causing loss of charging						

Time	Position	Applicant's Actions or Behavior
	RO	b) Close <u>all</u> Letdown Isolation Valves: 1) PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. ☐ 2) PVT-8152, LTDN LINE ISOL. ☐ 3) LCV-459, LTDN LINE ISOL. ☐ 4) LCV-460, LTDN LINE ISOL. ☐ c) Close FCV-122, CHG FLOW. ☐ d) Verify CCW flow to the RCP Thermal Barriers is GREATER THAN 90 gpm on FI-7273A(B), THERM BARR FLOW GPM. ☐ e) Display Dedicated Display ZZRCPBRG on the IPCS to monitor RCP temperatures. ☐ f) Contact Electrical and Mechanical Maintenance to investigate. ☐
	RO	IF Charging Pump suction is aligned to the VCT THEN ensure both LCV-115C(E), VCT OUTLET ISOL, are open (**YES**)
	RO	If “B” charging pump is to be used, starts “B” CCW pump and directs starting of “B” Chiller and Chilled Water pump.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	5	Page	24	of	45
Event Description:	Charging pump bearing seizes causing loss of charging								

Time	Position	Applicant's Actions or Behavior
	RO	perform one of the following: c. Check the Charging header valve lineup as follows: 1) Ensure MVG-8107, CHG LINE ISOL, is open. ☐ 2) Ensure MVG-8108, CHG LINE ISOL, is open. ☐ 3) Ensure FCV-122, CHG FLOW, is in MAN and CLOSE. ☐ 4) Ensure <u>one</u> of the following valves is open: • PVT-8146, NORM CHG TO RCS LP B. ☐ <u>OR</u> • PVT-8147, ALT CHG TO RCS LP A. ☐ 5) Verify VCT level is GREATER THAN 20%. ☐ b. Ensure the following valves are open: 1) MVG-8106, CHG PP. ☐ 2) MVT-8109A(B)(C), CHG PP A(B)(C). ☐ 3) MVG-8130A(B), LP A SUCT TO CHG PP C. ☐ 4) MVG-8131A(B), LP B SUCT TO CHG PP C. ☐ 5) MVG-8132A(B), CHG PP C TO LP A DISCH. ☐ 6) MVG-8133A(B), CHG PP C TO LP B DISCH. ☐

Op Test No.: 2011 NRC Scenario # Spare Event # 5 Page 25 of 45

Event Description: Charging pump bearing seizes causing loss of charging

Time	Position	Applicant's Actions or Behavior
	RO	Directs Aux building operator to locally verify suction pressure

Booth Instructor:

When contacted as ABLL, report suction pressure as 57 psig.

Booth Instructor: if asked, "B" Charging pump was running yesterday prior to train swap.

Booth Instructor:

When contacted as SS, authorize starting either "B" or "C" charging pump.

Time	Position	Applicant's Actions or Behavior
	Crew	Directs racking up "C" charging pump on "A" train <u>or</u> starting "B" train CCW

Booth Instructor:

When contacted as Intermediate Building operator, use trigger 7 to rack up "C" chg pump. Report that the pump was last operated seven days ago.

Report that Att. VA to SOP-102 is complete.

Time	Position	Applicant's Actions or Behavior
	CRS	Determines that flushing of the casing in **not** required
	RO	Checks that XPP-43B(C)-PP1, CHG PP B(C) AUX OIL PP, is running.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	5	Page	26	of	45

Event Description: Charging pump bearing seizes causing loss of charging

Time	Position	Applicant's Actions or Behavior
	RO	Starts XPP-0043B(C), PUMP B(C). (PEER check)
	RO	Verifies XPP-43B(C)-PP1, CHG PP B(C) AUX OIL PP, stops automatically
	RO	Verifies PI-121, CHG PRESS PSIG, is between 2650 psig and 2850 psig
	RO	Monitors the following for proper pump operation: a. LR-459, PZR % LEVEL & LEVEL SP. b. FI-130A, RCP A INJ FLO GPM. c. FI-127A, RCP B INJ FLO GPM. d. FI-124A, RCP C INJ FLO GPM.
	RO	Places FCV-122, CHG FLOW, in MAN and close.
	RO	Places PCV-145, LO PRESS LTDN, in MAN and open to 70%. (PEER check)
	RO	Places TCV-144, CC TO LTDN HX, in MAN and open to 100%.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	5	Page	27	of 45
Event Description:	Charging pump bearing seizes causing loss of charging							

Time	Position	Applicant's Actions or Behavior
	RO	Places TCV-143, LTDN TO VCT OR DEMIN, in VCT.
	RO	Opens PVT-8152, LTDN LINE ISOL.
	RO	Opens the following: a. LCV-459, LTDN LINE ISOL. b. LCV-460, LTDN LINE ISOL.
	RO	Ensure the following Charging Line Isolation Valves are open: a. MVG-8107, CHG LINE ISOL. b. MVG-8108, CHG LINE ISOL.
	RO	Slowly open FCV-122, CHG FLOW, to establish 60 gpm flow as indicated on FI-122A, CHG FLOW GPM.

Op Test No.: 2011 NRC Scenario # Spare Event # 5 Page 28 of 45

Event Description: Charging pump bearing seizes causing loss of charging

Time	Position	Applicant's Actions or Behavior
	RO	Open Orifice Isolation Valves to obtain the desired Letdown flow rate (60 gpm to 120 gpm): a. PVT-8149A, LTDN ORIFICE A ISOL (45 gpm). b. PVT-8149B, LTDN ORIFICE B ISOL (60 gpm) OR c. PVT-8149C, LTDN ORIFICE C ISOL (60 gpm).
	RO	Adjust FCV-122, CHG FLOW, as required to maintain TI-140, REGEN HX OUT TEMP °F, between 250°F and 350°F while maintaining Pressurizer level.
	RO	Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig.
	RO	Place PCV-145, LO PRESS LTDN, in AUTO.
	RO	Adjust TCV-144, CC TO LTDN HX, potentiometer as necessary to maintain the desired VCT temperature and place in AUTO.
	RO	When Pressurizer level is within 1% of and trending to programmed level, place the PZR LEVEL MASTER CONTROL in MAN.

Op Test No.: 2011 NRC	Scenario # Spare	Event # 5	Page 29 of 45
Event Description:	Charging pump bearing seizes causing loss of charging		

Time	Position	Applicant's Actions or Behavior
	RO	Establish automatic FCV-122, CHG FLOW, control as follows: a. Determine the correct PZR LEVEL MASTER CONTROL setpoint by dividing the current Charging flow by 1.5. b. Manually adjust the PZR LEVEL MASTER CONTROL to this setpoint. c. Place FCV-122, CHG FLOW, in AUTO. . (PEER check)
	RO	Adjust PZR LEVEL MASTER CONTROL in MAN, as necessary, to maintain Pressurizer level at or near programmed level.
	RO	When Pressurizer level is within 1% of and trending to programmed level, place PZR LEVEL MASTER CONTROL in AUTO. . (PEER check)
	RO	Monitor LR-459, PZR % LEVEL & LEVEL SP, recorder to verify that Charging flow is maintaining actual Pressurizer level at or near the programmed setpoint.
	RO	After the Letdown temperatures have stabilized, place TCV-143, LTDN TO VCT OR DEMIN, in DEMIN/AUTO.

At the discretion of the Lead Examiner, proceed to the next event

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	30	of	45

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior

Booth Instructor:

When directed, activate trigger 6.

Indications available:

Indications available:

XCP-614 pt. 5-1 CHG FLO HI/LO

XCP-616 pt. 1-5 PZR LCS DEV HI/LO

XCP-616 pt. 2-2 PZR PRESS LO

XCP-616 pt. 2-3 PZR PRESS HI/LO

XCP-616 pt. 1-3 BLCK HTRS ISOL LTDN PZR LCS LO

	Crew	Refer to alarm response procedures
		PROBABLE CAUSE: 1. RCS temperature transient. 2. RCS excessive leakage **(yes)**. 3. Flow controller malfunction. 4. Charging Pump malfunction. 5. Flow control valve failure.

Op Test No.: 2011 NRC	Scenario # Spare	Event # 6, 7, 8	Page 31 of 45				

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
	CRS	Transitions to AOP-101.1 LOSS OF REACTOR COOLANT NOT REWIRING SI
NOTE; If a Reactor Trip occurs AND SI is NOT required, this procedure should be continued after the actions of EOP-1.1. REACTOR TRIP RECOVERY, are completed.		
IOA	RO	Verify PZR level is at or trending to program level **(NO).**
IOA	RO	a) Open FCV-122. CHG FLOW as necessary to maintain PZR level.
IOA	RO	b) If PZR level continues to decrease **(yes)**, THEN reduce Letdown to one 45 gpm orifice: 1) Set PCV-145, LO PRESS LTDN to 70%. 2) Ensure PVT-8149A. LTDN ORIFICE A ISOL is open. 3) Close both PVT-8149B(C)LTDN ORIFICE B(C) ISOL. 4) Adjust PCV-145, LO PRESS LTDN to maintain PI-145 LO PRESS LTDN PRESS PSIG between 300 psig and 400 psig. 5) Place PCV-145, LO PRESS LTDN, in AUTO.
IOA	RO	2. Check if SI is required: a. Check if any of the following criteria are met: • PZR level is decreasing with Charging maximized and Letdown minimized. • PZR level is approaching 12% **(yes)**. • PZR pressure is approaching 1870 psig. • VCT level is approaching 5% **(yes)**.

Op Test No.: 2011 NRC	Scenario # Spare	Event # 6, 7, 8	Page 32 of 45
Event Description: LOCA Outside Containment			

Time	Position	Applicant's Actions or Behavior
IOA	RO	b. Perform the following: 1) Trip the Reactor 2) GO TO EOP-1.0. REACTOR TRIP/SAFETY INJECTION ACTUATION. <u>WHEN</u> EOP-1.0 Immediate Actions are complete, THEN actuate SI.
	CRS	Direct entry to EOP-1.0, Reactor Trip/Safety Injection Actuation
IOA	RO	Verify Reactor Trip: • Trip the Reactor using either Reactor Trip Switch. • Verify all Reactor Trip and Bypass Breakers are open. • Verify all Rod Bottom Lights are lit. • Verify Reactor Power level is decreasing.
IOA	BOP	Verify Turbine/Generator Trip: a. Verify all Turbine STM Stop VLVs are closed. b. Ensure Generator Trip (after 30 second delay): 1) Ensure the GEN BKR is open. 2) Ensure the GEN FIELD BKR is open. 3) Ensure the EXC FIELD CNTRL is tripped.
IOA	BOP	Verify both ESF buses are energized.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	33	of 45
Event Description:	LOCA Outside Containment							

Time	Position	Applicant's Actions or Behavior
IOA	RO	Check if SI is actuated: a. Check if either: • SI ACT status light is bright on XCP-6107 1-1 **(NO)**. Or • Any red first out SI annunciator is lit on XCP-626 top row **(NO)**.
CRITICAL TASK	RO	b. Actuate SI using either SI ACTUATION Switch
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
Evaluator Note: **The steps for Attachment 3, SI EQUIPMENT VERIFICATION can be found at the end of this scenario guide. Page 47**		
	Crew	Announce plant conditions over the page system.
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen. **(YES)**

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	34 of 45
Event Description:	LOCA Outside Containment						

Time	Position	Applicant's Actions or Behavior
	RO	Verify both the following annunciators are lit: c. XCP-612 3-2 (RB SPR ACT). d. XCP-612 4-2 (PHASE B ISOL).
	RO	Check RCS temperatures: With no RCP running, RCS Tcold is stable at OR trending to 557°F. **(NO)**
	RO	Close IPV-2231, MS/PEGGING STM TO DEAERATOR.
	RO	Throttle EFW to 450 gpm total until one SG > 26%.
	RO	Check if PZR PORVs are closed **(yes)**.
	RO	Check if PZR Spray Valves are closed **(yes)**.
	RO	Verify power is available to at least one PZR PORV Block Valve: • MVG-8000A, RELIEF 445 A ISOL **(yes)**. • MVG-8000B, RELIEF 444 B ISOL**(yes)**. • MVG-8000C, RELIEF 445 B ISOL **(yes)**.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	35	of 45
Event Description:	LOCA Outside Containment							

Time	Position	Applicant's Actions or Behavior
	RO	Verify at least one PZR PORV Block Valve is open **(yes)**..
		NOTE - Step 11 Seal Injection flow should be maintained to all RCPs.
	RO	Check if RCPs should be stopped: **(NO)**
	RO	Verify no SG is FAULTED: • No SG pressure is decreasing in an uncontrolled manner **(yes)**. • No SG is completely depressurized. **(yes)**.
	RO	**Verify Secondary radiation levels indicate SG tubes are NOT RUPTURED: (yes)**
	RO	**Check if the RCS is INTACT: (yes based on CNTMT conditions)**
	RO	**Reset both SI RESET TRAIN A(B) Switches.**

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	36	of	45

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
	RO	**Reset Containment Isolation:** • RESET PHASE A - TRAIN A(B) CNTMT ISOL. ' • RESET PHASE B - TRAIN A(B) CNTMT ISOL.
	BOP	**Place both ESF LOADING SEQ A(B) ' RESETS to:** a. NON-ESF LCKOUTS. ' b. AUTO-START BLOCKS.
	RO	**Establish Instrument Air to the RB:** a. Verifies the "A" IA compressor is running and Verifies the "B" IA compressor is in standby b. Opens PVA-2659, INST AIR TO RB AIR SERV. c. Opens PVT-2660, AIR SPLY TO RB.
	RO	Check if SI flow should be reduced: **(no)**
	CRS	**Initiate monitoring of the Critical Safety Function Status Trees. REFER TO EOP-12.0, MONITORING OF CRITICAL SAFETY FUNCTIONS.**
Evaluator's note; STA can perform this function as directed 10 minutes after he is called to the control room.		

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	37 of 45

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
*	RO	Check SG levels; a. Verify level in all SGs > 26% **(yes)** b. Control EFW flow to maintain NR levels 40%-60%
	RO	Check if secondary activity is normal **(yes)**
	RO	Check for loss of Reactor Coolant outside Containment **(yes)** a. Verify AB radiation levels are normal on: • RM-A3, MAIN PLANT VENT EXH ATMOS MONITOR: PARTICULATE, IODINE, GAS. ☐ • RM-A13, PLANT VENT HI RANGE. ☐ • RM-A11, AB VENT GAS ATMOS MONITOR. ☐ • Local area monitors. ☐ b. Verify annunciator XCP-631 6-1 is NOT lit (AB SMP LVL HI). ☐ c. Verify annunciators XCP-606 3-4 and XCP-607 3-4 are NOT lit (LD TRBL AB SMP/FLDRN LVL HI). ☐
	CRS	23 Evaluate the cause of abnormal AB conditions. IF the cause is a loss of RCS inventory outside Containment, THEN GO TO EOP-2.5, LOCA OUTSIDE CONTAINMENT, Step 1. ☐

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page 38	of 45
Event Description:	LOCA Outside Containment						

Time	Position	Applicant's Actions or Behavior
	CRS	Enters EOP-2.5 LOCA OUTSIDE CONTAINMENT
Booth Operator Instructions: ramp flex leak size to 1100 gpm over 5 minutes to maintain RCS pressure decrease trend for clear EOP path.		
	Crew	Announces plant conditions over the page system.
	RO	2 Ensure the following are closed: a. RHR Pump Suction Valves from the RCS: 1) MVG-8701A and MVG-8702A, RCS LP A TO PUMP A (Status Lights XCP-6106 1-11(2-11)), for Train A. ☐ 2) MVG-8701B and MVG-8702B, RCS LP C TO PUMP B (Status Lights XCP-6106 1-12(2-12)), for Train B. ☐

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	39	of	45

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
	RO	b. Other paths out of Containment: 1) Normal Letdown Isolation: • PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. ☐ • PVT-8152, LTDN LINE ISOL. ☐ 2) RCP Seal Return Isolation: • MVT-8100, SEAL WTR RTN ISOL. ☐ • MVT-8112, SEAL WTR RTN ISOL. ☐ 3) PZR Sample Isolation: • SVX-9356A, PZR STM SMPL ISOL. ☐ • SVX-9356B, PZR LIQ SMPL ISOL. ☐ 4) RCS Loop B Sample Isolation: • SVX-9364B, RCS LP B SMPL ISOL. ☐ • SVX-9365B, RCS LP B SMPL ISOL. ☐ 5) RCS Loop C Sample Isolation: • SVX-9364C, RCS LP C SMPL ISOL. ☐ • SVX-9365C, RCS LP C SMPL ISOL. ☐

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	40	of	45
Event Description:	LOCA Outside Containment								

Time	Position	Applicant's Actions or Behavior
	RO	Check if RCS pressure is continuing to decrease **(yes)**.
Booth operator instructions; adjust valve leak up to 20% and increase size of flex as required to keep RCS pressure trending down.		
	RO	4 Try to identify and isolate the break: a. Close MVG-8888A, RHR LP A TO COLD LEGS. ☐ b. Check if RCS pressure is continuing to decrease. ☐ c. Open MVG-8888A, RHR LP A TO COLD LEGS. ☐ d. Close MVG-8888B, RHR LP B TO COLD LEGS. ☐ e. Check if RCS pressure is continuing to decrease. ☐ f. Open MVG-8888B, RHR LP B TO COLD LEGS. ☐ **(not successful)**
	RO	Check if RCS pressure is continuing to decrease **(yes)**
	CRS	Transitions to EOP-2.4 LOSS OF EMERGENCY COOLANT RECIRCULATION.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	41	of	45

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior

Lead Examiner can terminate the scenario at this point.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	42	of 45
Event Description:	LOCA Outside Containment							

Time	Position	Applicant's Actions or Behavior

ATTACHMENT 3 - SI EQUIPMENT VERIFICATIONS		
	BOP	Ensure EFW Pumps are running: a. Ensure both MD EFW pumps are running. b. Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Ensure the following EFW valves are open: • FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C). • FCV-3536(3546)(3556), TD EFP TO SG A(B)(C) • MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm.
	BOP	Ensure FW Isolation: a. Ensure the following are closed: • FW Flow Control • FW Isolation, PVG-1611A(B)(C). • FW Flow Control Bypass, FCV-3321(3331)(3341). • SG Blowdown, PVG-503A(B)(C). • SG Sample, SVX-9398A(B)(C). b. Ensure all Main FW Pumps are tripped

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	43 of 45
Event Description:	LOCA Outside Containment						

Time	Position	Applicant's Actions or Behavior
	RO	Ensure SI Pumps are running: • Two Charging Pumps are running. • Both RHR Pumps are running.
	BOP	Ensure two RBCU Fans are running in slow speed (one per train)
	BOP	Verify Service Water to the RBCUs: a. Ensure two Service Water Pumps are running. b. Ensure both Service Water Booster Pumps A(B) are running. c. Verify GREATER THAN 2000 gpm flow for each train on: a. FI-4466 , SWBP A DISCH FLOW GPM. b. FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running.
	BOP	Ensure two Chilled Water Pumps and Chillers are running.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	44	of 45
Event Description:	LOCA Outside Containment							

Time	Position	Applicant's Actions or Behavior
	BOP	Check if Main Steamlines should be isolated: a. Check if any of the following conditions are met: • RB pressure GREATER THAN 6.35 psig. OR • Steamline pressure LESS THAN 675 psig. OR • Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F. b. Ensure ALL the following are closed: • MS Isolation Valves, PVM-2801A(B)(C). • MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Ensure Excess Letdown Isolation Valves are closed: • PVT-8153, XS LTDN ISOL. • PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
	BOP	Verify proper SI alignment: a. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. b. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. c. Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM. d. Check if RCS pressure is LESS THAN 250 psig. e. Verify RHR flow on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM AND • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.

Op Test No.:	2011 NRC	Scenario #	Spare	Event #	6, 7, 8	Page	45	of	45

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
	BOP	Verify proper SI alignment: f. Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. g. Verify all SAFETY INJECTION monitor lights are dim on XCP-6106. h. Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM. i. Check if RCS pressure is LESS THAN 250 psig. j. Verify RHR flow on: • FI-605A, RHR DISCHARGE PUMP A FLOW GPM AND • FI-605B, RHR DISCHARGE PUMP B FLOW GPM.

CONTROL ROOM SUPERVISOR RELIEF CHECKLIST

DATE/TIME: ____________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 40% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2- Thumderstorms) / / B1 Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Control Room Supervisor		
	Operations in progress (GOPs, SOPs, load changes, etc.):	
	GOP 4A step 3.12L	
	Operations scheduled for oncoming shifts:	
	Raise power to 100%	
	Plant safeguard systems in degraded status:	
		Initials
	In the Control Room, all books are replaced, the desk and console tops are clear, and all trash is properly disposed of.	
	Station Log completed.	

Oncoming Control Room Supervisor			Initials
Oncoming watch has reviewed the VCS Switchgear mailbox for switching orders.			
Plant Status (to be completed prior to turnover):			
Plant ESF System Status:			
	Component Cooling System		
	Service water System		
	Reactor Building Cooling System		
	Reactor Building Spray System		
	Accumulator Tanks		
	RHR System		
	Charging/Safety Injection System		
	Emergency Feedwater System		
	Diesel Generator		
	Chilled Water System		
	Control Room Ventilation System		
	Position indications, power availability, and annunciator alarms are normal for present plant conditions.		
	Plant Parameters	Limit	
	Reactor Power	0-100%	
	RCS Tavg	≤589.2°F per loop	
	RCS Pressure	<2385 psig	
	RCS Flow	>100% per loop	
	RCS Subcooling	Normal	
All parameters within allowable limits for plant conditions. If not, what actions are being taken to correct conditions:			
Review of Logs:			
	Station Log		
	Removal and Restoration Log		
	Tagout Log		
	Special Orders		
Shift Turnover (to be completed during turnover):			
	Briefing on plant conditions by offgoing Control Room Supervisor.		
	Review of SPDS and BISI displays.		
	Identification of in-progress procedures including their present status and locations.		

CHG C

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Control Room Supervisor	
	Offgoing Control Room Supervisor	
	Shift Supervisor review	

REACTOR OPERATOR RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 40% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x 2- Thumderstorms) / / B1 Maintenance Week // A Train Chilled Water
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Reactor Operator	Initials
Main Control Board (Reactor Operator portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Reactor Operator area of responsibility.	

Oncoming Reactor Operator	Initials
Review of HVAC Panel.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Review of Main Control Board Panels.	

System Alignment	A	B	C	Train aligned to	Reasons for any inoperable equipment
Service Water Pumps	X	X		A	
Component Cooling Pumps	X			A	
Charging Pumps	X			A	
HVAC Chillers	X			A	
Reactor Building Spray Pumps					
RHR Pumps					
			TDEFP		
Emergency Feedwater Pumps					
Inoperable Radiation Monitors					

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Reactor Operator	
	Offgoing Reactor Operator	
	Shift Supervisor review	

BALANCE OF PLANT RELIEF CHECKLIST

DATE/TIME: ______________________

LOG SECTION

Date	Entry
11:45	Entered ACTION R&R 110538 on XPP0038B "B" RB Spray Pump, 72 hour action per T/S 3.6.2.1

RELIEF SECTION

Turnover Notes
Mode 1 // 40% Rx Power // EOOS is YELLOW (XEG0001B, XPP0038B, LOSP x2- Thumderstorms) // B1 Maintenance Week
XPP0038B B RB Spray Pump RTO/LOTO
"B" Diesel R&R/LOTO, GTP 702 Attachment VI Y-2, STP-125.001 due in 7 hours, Supplemental equipment walkdown due in 3 hours

Offgoing Balance Of Plant	Initials
Main Control Board (Balance Of Plant portion) properly aligned for the applicable mode.	
Housekeeping is satisfactory in the Balance Of Plant area of responsibility.	

Oncoming Balance Of Plant	Initials
Review of Main Control Room Panels.	
Review of Station Log.	
Review of Removal & Restoration Log.	
Test annunciator lights (with Offgoing operator concurrence).	

C02→	To the best of my knowledge, I am fully qualified to assume this watch taking into consideration fitness for duty, requalification status, and minimum watchstanding qualification.	
Shift relief completed:	Oncoming Balance Of Plant	
	Offgoing Balance Of Plant	
	Shift Supervisor review	

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPSF-045B**

ENSURE CONTAINMENT ISOLATION

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 0

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-055-05-01 RESPOND TO LOSS OF OFF SITE AND ON SITE POWER

TASK STANDARD:

Containment isolation verified and complete with IFV-4701B directed to be closed and 2662 A is closed from the Main Control Board. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: XVT-2662 A is closed and local operator reports IFV-4701B is closed.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
SIMULATOR	PERFORM

REFERENCES: EOP-1.0 REACTOR TRIP/SAFETY INJECTION ACTUATION

INDEX NO.	***K/A NO.***		***RO***	***SRO***
103000K102	K1.02	Containment isolation/containment integrity	3.9	4.1

TOOLS: EOP-1.0, Attachment 3, Step 13-14. Attachment 4 and 5.

EVALUATION TIME 10 ***TIME CRITICAL*** NO ***10CFR55:*** 45(a)3

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: _____ UNSAT: _____

EXAMINER: ______________________ ______________________ / __________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: The plant has just experienced a LOCA and safety injection.

INITIATING CUES: The CRS directs verifying Phase "A" and Containment Ventilation Isolation per EOP-1.0, Attachment 3, Step 13.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: The plant has just experienced a LOCA and safety injection.

INITIATING CUES: The CRS directs verifying Phase "A" and Containment Ventilation Isolation per EOP-1.0, Attachment 3, Step 13.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	Verifies Phase "A" and Containment Ventilation Isolation on XCP-6103, 6104 and 6106. REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed. (This is EOP-1.0 Att. 3 Step 13).	Operator ensures Phase "A" Isolation by appearance of phase "A" valve status lights on MCB XCP-6104, 6103 and 6106. Refers to Attachment 4. Notes RB AIR SERV ISOL 2662A(B) CLSD are both dim. Also notes that SG B BLWDN ISOL 503B CLSD and CDRM CLG WTR ISOL 7501 CLSD are also both dim.

COMMENTS:

SAT ______

UNSAT

STEP: 2

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	Actuates Phase A/Containment Ventilation Isolation.	Places either (or both) TRAIN A & B CS-SG02A(B) switch to ACTUATE position. Notes that CDRM CLG WTR ISOL 7501 CLSD now turns bright, but that none of the other indicators change states.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	Operator attempts to close 503B, 2662 A, and 2662 B from the MCB valve control switches.	Places the control switches (individually) for 503B, 2662 A, and 2662 B to the "CLOSED" position. Notes 2662 A closes but that the other valves still indicate that they are open.

COMMENTS:

SAT ______

UNSAT

STEP: 4

CUES:

NOTE TO EVALUATOR: Steps 3, 4, and 5 should be performed in sequence.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Operator refers to Attachment 5 to identify backup isolation valve for XVG-503B	Operator determines that IFV4701B is the backup valve for XVG-503B. (Page 1 of Attachment 5).

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

NOTE: Since 503B is an air operated valve outside of containment the AO may be directed to locally bleed air off 503B to isolate the penetration as well.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Directs AO to locally close IFV-4701B	Uses plant page or radio to direct AB lower to close IFV-4701B backup to MVG-503B, STEAM GEN B BLOWDOWN HEADER ISOL VALVE.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPSF-045B

DESCRIPTION: ENSURE CONTAINMENT ISOLATION

IC SET: 10

INSTRUCTIONS:

1. Activate:

VLV-IA002P	SEVERITY=100	(XVT-2662A fails to 100% open position)
VLV-IA003P	SEVERITY=100	(XVT-2662B fails to 100% open position)
VLV-BD002P	SEVERITY=100	(XVG-503B fails to 100% open position)
VLV-AC001P	SEVERITY=100	(XVT 7501A fails to 100% open position)

Logic to get valves to move correctly

Event 1: X021053A==1| X021054A==1
VLV-AC001P SEVERITY=0 RAMP=25 (XVT 7501A closes when Phase A initiated)

Event 2: X021407C==1
VLV-IA002P SEVERITY=100 DELETE= 01 (XVT-2662A is allowed to be closed)

MAL-RCS005A (Large break LOCA on 'A' loop)

2. RUN 120 Seconds

3. While running, trip RCP's and perform immediate action of EOP-1.0.

4. When student is ready:

RUN

5. When requested by student to locally close XVT-4701 B wait 5 minutes and then report that valve is closed.

COMMENTS:
Performance of this JPM is related to PRA event 0-CNTMISOL-HE "Operator fails to manually initiate Phase A Isolation".

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPS-158**

MONITOR SOURCE RANGE AND ENABLE AUDIO COUNT RATE

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 1

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-007-05-01 RESPOND TO REACTOR TRIP

TASK STANDARD:

Candidate enables SOURCE RANGE HIGH FLUX AT SHUTDOWN and enables Audible Count Rate.

TERMINATING CUE: Audible Count Rate is heard in the control room.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
SIMULATOR	PERFORM

REFERENCES: SOP-404 EXCORE NUCLEAR INSTRUMENTATION SYSTEM

INDEX NO.	***K/A NO.***		***RO***	***SRO***
0150002123	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	4.4

TOOLS: SOP-404

EVALUATION TIME 15 ***TIME CRITICAL*** NO ***10CFR55:*** 45b(4)

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ______________________________ ______________________/____________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: Normal shutdown has occurred and IPCS is available.

INITIATING CUES: The CRS directs you to perform SOP-404, Section IV. D. SOURCE RANGE COUNTS MONITORING.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: Normal shutdown has occurred and IPCS is available.

INITIATING CUES: The CRS directs you to perform SOP-404, Section IV. D. SOURCE RANGE COUNTS MONITORING.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Type the Turn-On-Code HFAS	Types HFAS into IPCS computer.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	Ensure OPERATOR ENABLED is indicated above the DISABLED CALCS box. If OPERATOR DISABLED is indicated, select ENABLE CALCS.	Ensure HFAS is enabled.

COMMENTS:

SAT

UNSAT ______

STEP: 3

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Ensure the IPCS is selected to the respective Mode for current plant conditions (i.e., 3-6).	Checks current conditions and determines plant is in MODE 3 Ensures IPCS is selected to MODE 3.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

NOTE: Candidate should ask for a peer check on this step.

CR SEQ

No Yes

Verify the IPCS is calculating High Flux At Shutdown OPCRIT Alarm values properly as follows:
a) The N0031A ALARM LIMIT MODES 3-6 (U0034) value is less than or equal to 1.8 times the N0031A1M value.
b) The N0032A ALARM LIMIT MODES 3-6 (U0035) value is less than or equal to 1.8 times the N0032A1M value.

STEP STANDARD:

Takes N0031A and multiplies it by 1.8. Verifies this is less than or equal to N0031A1M value.
Takes N0032A and multiplies it by 1.8. Verifies this is less than or equal to N0032A1M value.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

PROMPT: Tell candidate that time compression has been used and Source Range Channels have stabilized.

CR SEQ

No Yes

After Source Range Channels have stabilized and the rate channels are relatively constant, or following ten hours of monitoring per Attachment III, whichever comes first, complete the following:

STEP STANDARD:

Monitors source range count rates.

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

PROMPT: When called as I&C to calibrate the High Flux At Shutdown Alarm, prompt that time compression is being utilized and that I&C reports that the High Flux At Shutdown Alarm is now calibrated.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Contact I&C to calibrate the High Flux At Shutdown Alarm.	Calls I&C and directs them to calibrate the High Flux At Shutdown Alarm.

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	After the first calibration has been performed, initiate GTP-702, Attachment VI.KK, High Flux At Shutdown - Post Trip/Reactor Shutdown.	Writes SOP-404 in blank that states, "Procedure which directed calibration" Writes current date and time in blank that states, "Initial Calibration Time (T)" Calculates and write time and date for T+12, T+24, and T+ 48.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

NOTE: Candidate should ask for a peer check for this step.

CR	***SEQ***		***STEP STANDARD:***
Yes	No	Place both SOURCE RANGE HIGH FLUX AT SHUTDOWN Switches, in NORMAL.	Places both SOURCE RANGE HIGH FLUX AT SHUTDOWN Switches, in NORMAL.

COMMENTS:

SAT

UNSAT ______

STEP: 9

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Select the highest reading Source Range Channel, on the CHANNEL SELECTOR Switch.	Determines which source range channel is higher and chooses it on the CHANNEL SELECTOR Switch.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Adjust the AUDIO MULTIPLIER Switch, as necessary, to maintain a distinguishable audio count rate.	A audible count rate is heard in the Control Room.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPS-158

DESCRIPTION: MONITOR SOURCE RANGE AND ENABLE AUDIO COUNT RATE

IC SET: IC-21

INSTRUCTIONS:

Use GOP-5 and AOP-214.1 to trip the reactor.

Run until source range goes below P-6 and select both source ranges on NR-45.

COMMENTS:

Before each candidate ensure:

1. that audio multiplier is set to off (no audio count rate)
2. that scalar timer still has power on and is started so that numbers are counting (I&C would do this during calibration)
3. that IPCS is in MODE 3
4. that IPCS HFAS is set to operator disabled.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPSF-012A**

DROPPED ROD RECOVERY

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 3

CANDIDATE: ______________________

EXAMINER: ______________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-003-05-01 RESPOND TO DROPPED CONTROL ROD

TASK STANDARD:

Manual reactor trip inserted after second control rod drops. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: Manual reactor trip inserted.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
SIMULATOR	PERFORM

REFERENCES: AOP-403.6 DROPPED CONTROL ROD

INDEX NO.	***K/A NO.***		***RO***	***SRO***
000003A102	AA1.02	Controls and components necessary to recover rod	3.6	3.4

TOOLS: AOP-403.6 (TO RECORD AFFECTED BANK HEIGHTS and to provide engineering numbers for limitations on rod withdrawal rates).

EVALUATION TIME 15 ***TIME CRITICAL*** No ***10CFR55:*** 45(A)5

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ____________________ ____________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant was operating at 75% power with all controls in automatic when Control Rod "F2" dropped due to a blown fuse. The blown fuse was replaced in the 1AC power cabinet. Actions of AOP-403.6 have been completed through Step 10. Maximum power level and rod recovery rate have been established per the AOP.

INITIATING CUES: CRS has directed NROATC to recover Control Rod "F2" per AOP-403.6, starting with Step 11.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant was operating at 75% power with all controls in automatic when Control Rod "F2" dropped due to a blown fuse. The blown fuse was replaced in the 1AC power cabinet. Actions of AOP-403.6 have been completed through Step 10. Maximum power level and rod recovery rate have been established per the AOP.

INITIATING CUES: CRS has directed NROATC to recover Control Rod "F2" per AOP-403.6, starting with Step 11.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Record Step Counter readings for both groups of the AFFECTED bank.	Step counter reading for both groups in Control Bank "A" have been recorded as 230 steps.

COMMENTS:

SAT ______

UNSAT ______

STEP: 2

CUES:

Booth Operator: When told to take key 91 and go to the Rod Control Cabinet (IB-463) and locally at XCA4-CR P/A Converter Cabinet for the affected bank give Examinee P/A Converter reading of 230 steps.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Record P/A Converter Reading.	P/A Converter reading has been recorded.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Rotate ROD CNTRL BANK SEL Switch clockwise to the AFFECTED bank position.	ROD CNTRL BANK SEL Switch has been rotated clockwise to the CBA position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

Resetting Shutdown Bank A vs. Control Bank A constitutes a failure of this step if the error is not detected and corrected before withdrawing the dropped rod.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Reset the Step Counter for the AFFECTED group to zero.	Momentarily depresses the RS pushbutton on the Step Counter for Bank A GROUP 1. Notes the indication is 000.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

As the CRS, Examiner should prompt the Examinee to disconnect the affected bank. Explain that the BOP Operator will watch the MCB while he accomplishes this task.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Place all Lift Coil Disconnect Switches for the affected bank, except switches for the dropped rod, to the ROD DISCONNECTED position.	All lift coil disconnect switches for Control Bank "A" rods, except Rod "F2" have been placed in the ROD DISCONNECTED position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

If rod withdrawal rate is requested, inform Examinee to refer to the provided AOP. Rod Control System Fail Urgent Alarm will alarm. If Examinee asks whether to depress the ROD CNTRL ALARM RESET switch, as the CRS, direct Examinee to depress the switch after the rod has been realigned.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Withdraw the dropped rod: Drive the affected bank out.	Rod F2 is moving in the outward direction.

COMMENTS:

SAT

UNSAT ______

STEP: 7

CUES:

CR SEQ

No Yes Verify dropped rod movement on DRPI.

STEP STANDARD:

DRPI indicator for rod "F2" in Control Bank "A" is verified to be moving out in 6 step increments.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR SEQ

No Yes When dropped rod moves 6 steps, then verify ONE ROD ON BOTTOM annunciator clears.

STEP STANDARD:

ONE ROD ON BOTTOM annunciator is observed to be flashing (in the reset condition).

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

No turbine manipulations are required since Tavg will remain within 5°F of Tref.

CR SEQ

No Yes Adjust turbine load to maintain Tavg within ± 5°F of Tref.

STEP STANDARD:

Tavg - Tref within ± 5°F.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Continue rod withdrawal to the demand position.	Not more than 50 step increments or 80% power as determined in step 6.

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Observes that Rod F2 stops moving at 30 steps and is apparently stuck.	Notices that rod F2 is stuck by DRPI step 42 (+/- 6 step accuracy).

COMMENTS:

SAT

UNSAT ______

STEP: 12

CUES:

Booth Operator: When the candidate takes the control bank selector switch to Manual or determines that the rod is stuck and suspends rod withdraw (without taking the switch to manual, drop the second rod.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Places Rod Control Bank Selector Switch in Manual (IAW Immediate Operator Action from AOP-403.5).	Rod Control Bank Selector Switch is in Manual.

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Observes that Rod P-6 drops into the core while rod F2 remains stuck at approximately 30 steps.	Evaluates as 2 dropped rods.

COMMENTS:

SAT ______

UNSAT ______

STEP: 14

CUES:

The Examinee should insert a manual reactor trip upon observing control rod P6 drop. Continuing to withdraw original dropped rod more than 12 steps after the second rod is dropped constitutes failure.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Inserts a manual reactor trip.	Places the manual reactor trip switch to the TRIP position. Both reactor trip breakers indicate green light ON, red light OFF. All rod bottom lights are lit.

COMMENTS:

SAT ______

UNSAT

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPSF-012A

DESCRIPTION: DROPPED ROD RECOVERY

IC SET: 11 (75%)

INSTRUCTIONS:

1. RUN

2. Activate:

MAL-CRF004F2 FAIL TO = STATIONARY (Control rod F2 drops)

Set on Trigger #1 DELETE IN: 30 seconds TD = 0

4. Control Tavg-Tref deviation within ±1.5°F with rods in AUTO.

5. Place rod control in MANUAL.

6. Allow SIPCS to update QPTR and Axial Flux parameters prior to going to FREEZE.

7. Record the following information in AOP-403.6 Step 7 & 9 prior to start:

Step 7:
Time Rod Dropped: 15 minutes ago
Dropped Rod Location: "F2"
Initial Power Level: 75%
Current Power Level: <75%
Current QPTR: 1.02

Step 9:
Power Level at which recovery is to be performed: <80%
Rod Rate: not more than 50 step increments.

8. FREEZE

9. When student is ready:

RUN

10. When control rod F2 is withdrawn to approximately 30 steps, insert:
MAL-CRF007F2 SELECT=UNTRIPPABLE (Rod F2 sticks)

11. When Rod Control is placed in Manual or the candidate stops rod withdraw due to the stuck rod insert:
MAL-CRF004P6 SELECT=STATIONARY (Control rod P6 drops)

COMMENTS:

Booth Operator: When told to take key 91 and go to the Rod Control Cabinet (IB-463) and locally at XCA4-CR P/A Converter Cabinet for the affected bank give Examinee P/A Converter reading of 230 steps.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPS-002A**

TRANSFER TO HOT LEG RECIRCULATION

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 2

CANDIDATE: ______________________

EXAMINER: ______________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-137-05-01 TRANSFER RHR FROM COLD LEG TO HOT LEG RECIRCULATION

TASK STANDARD:

Safety Injection system has been aligned for Hot Leg Recirculation. Charging pumps have not been runout or deadheaded. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: 'B' charging pump is started.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
SIMULATOR	PERFORM

REFERENCES:	EOP-2.0	LOSS OF REACTOR OR SECONDARY COOLANT
	EOP-2.3	TRANSFER TO HOT LEG RECIRCULATION

INDEX NO.	***K/A NO.***		***RO***	***SRO***
006000A402	A4.02	Valves	4.0	3.8
006000K418	K4.18	Valves normally isolated from their control power	3.6	3.7

TOOLS: EOP-2.3

EVALUATION TIME 10 ***TIME CRITICAL*** No ***10CFR55:*** 45(a)7

TIME START: ________ TIME FINISH: ________ PERFORMANCE TIME: ________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ____________________ ____________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: It has been 8 hours since a Loss of Coolant Accident occurred and the plant is presently in the Cold Leg Recirculation mode. The CRS has entered EOP-2.3 (Hot Leg Recirculation) from EOP-2.0. CHG/SI Pump C is aligned to "B" train.

INITIATING CUES: The CRS directs the NROATC to transfer from Cold Leg to Hot Leg Recirculation per EOP-2.3.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: It has been 8 hours since a Loss of Coolant Accident occurred and the plant is presently in the Cold Leg Recirculation mode. The CRS has entered EOP-2.3 (Hot Leg Recirculation) from EOP-2.0. CHG/SI Pump C is aligned to "B" train.

INITIATING CUES: The CRS directs the NROATC to transfer from Cold Leg to Hot Leg Recirculation per EOP-2.3.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

If Charging Pump "A" is still running when 8885 is closed, it will be deadheaded; this constitutes failure. Running the charging pump with both 8885 and 8884 open runs the pump out, also failing.

CR	SEQ		STEP STANDARD:
Yes	Yes	Align Train A Charging Pumps for Hot Leg Recirculation: Stop the Charging Pump on "A" Train	Places CHG/SI Pump 'A' control switch to STOP and verifies CHG/SI Pump 'A' indicates OFF.

COMMENTS:

SAT ______

UNSAT

STEP: 2

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	Check if CHG/SI Pump C is aligned to Train A by verifying XFER switch XET 2002C ON TRAIN A IS LIT.	XFER SWITCH XET 2002C on Train A is not lit, goes to alternative action.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	Ensure MVG-8132A and MVG-8132B, CHG PP C TO LP A DISCH are closed.	Places switch for MVG-8132A and MVG-8132B CHG PP C TO LP A DISCH to closed, verifying green light ON and red light is OFF for each valve.

COMMENTS:

SAT

UNSAT ______

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Close charging LP "A" ALT to COLD LEG (MVG-8885).	MVG-8885, CHG LP A TO COLD LEGS, indicates CLOSE.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

Note: Candidate must energize power lockout to change the position of MVG-8884

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Open CHG LP "A" to HOT LEGS (MVG-8884).	MVG-8884, CHG LP A TO HOT LEGS, indicates OPEN.

COMMENTS:

SAT

UNSAT ______

STEP: 6

CUES:

Booth Operator: If called to check out the "A" charging pump for a start report the pump is ready for start and that suction pressure is 53 psig.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Start "A" Charging Pump.	Places CHG/SI Pump 'A control switch to START and verifies CHG/SI PUMP "A" indicates ON with normal running amps.

COMMENTS:

SAT

UNSAT ______

STEP: 7

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Align Train B Charging Pumps for Hot Leg Recirculation: Stop "B" charging pump.	Places CHG/SI Pump 'B control switch to STOP and verifies CHG/SI Pump 'B' indicates OFF with 0 amps.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check if 'C' charging pump is aligned to Train B.	Verifies XFER SWITCH XET2000C ON TRAIN B is lit.

COMMENTS:

SAT ______

UNSAT

STEP: 9

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure MVG-8132A and MVG-8132B, CHG PP C TO LP A DISCH, are closed.	Ensures MVG-8132A and MVG-8132B, CHG PP C TO LP A DISCH, indicate CLOSED.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure MVG-8801A, HI HEAD to COLD LEG INJECTION, is closed.	MVG-8801A, HI HEAD TO COLD LEG INJ indicates CLOSED.

COMMENTS:

SAT

UNSAT ______

STEP: 11

CUES:

If 8801B is closed with "B" Charging Pump running, this deadheads the pump and constitutes failure of the JPM.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Close MVG-8801B, HI HEAD TO COLD LEG INJECTION valve.	Takes control switch for MVG-8801B, HI HEAD TO COLD LEG INJ, to the closed position, checks red light OFF and green light ON.

COMMENTS:

SAT ______

UNSAT ______

STEP: 12

CUES:

Note: Candidate must energize power lockout to change the position of MVG-8886

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Open MVG-8886,CHG LP B TO HOT LEGS.	MVG-8886, CHG LP B TO HOT LEGS, indicates OPEN.

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

Booth Operator: If called to check out the "B" charging pump for a start report the pump is ready for start and that suction pressure is 54 psig.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Start "B" CHG/SI pump.	Places CHG/SI Pump 'B control switch to START and verifies CHG/SI Pump 'B' indicates ON with normal running amps.

COMMENTS:

SAT

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPS-002A

DESCRIPTION: TRANSFER TO HOT LEG RECIRCULATION

IC SET: 10

INSTRUCTIONS:

1. Activate

   MAL-RCS005A RCS Loop 'A' DBA LOCA

2. RUN

3. Perform actions of EOP-1.0 and 2.0

4. FREEZE

5. Ensure RHR Sump Level >415', then activate LOA-AUX115 SEVERITY=0.17 (17% in RWST)

6. RUN

7. Transfer Cold Leg Injection to Cold Leg Recirculation IAW EOP-2.2.

8. To shift CCW to fast speed during EOP-2.2:

   LOA-CCW050 SELECT=FAST SPEED 'A' CCW Pump Speed Switch to fast
   or
   LOA-CCW052 SELECT=FAST SPEED 'C' CCW Pump Speed Switch to fast

9. Swap C Charging pump to B Train

LOA CVC045
LOA CVC044

10. FREEZE

11. When student is ready:

    RUN

COMMENTS:
Charging Pumps must be stopped before opening Hot Leg High Head Valves (8884/8886) to prevent pump runout.

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPSF-007**

STEAM GENERATOR TUBE RUPTURE
(DEPRESSURIZE RCS TO < RUPTURED S/G
PRESSURE)

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 13

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-038-05-01 RESPOND TO STEAM GENERATOR TUBE RUPTURE

TASK STANDARD:

RCS pressure is reduced to less than ruptured S/G pressure with PZR level > 18% or PZR level > 68% or RCS subcooling < 30°F. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations. This JPM is related to PRA event OAP2 " Depressurize RCS to stop leakage into ruptured S/G"

TERMINATING CUE: RCS depressurization complete when task standard met and PCV-444C & D are closed.

PREFERRED EVALUATION LOCATION SIMULATOR

PREFERRED EVALUATION METHOD PERFORM

REFERENCES: EOP-4.0 STEAM GENERATOR TUBE RUPTURE

INDEX NO.	***K/A NO.***		***RO***	***SRO***
000038A104	EA1.04	PZR spray, to reduce coolant system pressure	4.3	4.1

TOOLS: EOP-4.0

EVALUATION TIME 10 ***TIME CRITICAL*** No ***10CFR55:*** 45(a)6

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ______________________ ______________________ / ____________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A Steam Generator Tube Rupture is in progress. S/G "C" has been isolated per EOP-4.0. An operator initiated cooldown has been performed according to EOP-4.0, through Step 21.

INITIATING CUES: Control Room Supervisor directs operator to depressurize the RCS using PZR Spray, per EOP-4.0, Step 22.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A Steam Generator Tube Rupture is in progress. S/G "C" has been isolated per EOP-4.0. An operator initiated cooldown has been performed according to EOP-4.0, through Step 21.

INITIATING CUES: Control Room Supervisor directs operator to depressurize the RCS using PZR Spray, per EOP-4.0, Step 22.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Give examinee 1-2 minutes to familiarize himself with his control board indications and his place in the procedure.

CR	SEQ		STEP STANDARD:
Yes	Yes	Depressurize the RCS using normal spray valves PCV-444C and 444D.	Places PZR Spray PVC-444C & 444D controllers in MANUAL and increases output to 100% demand. Verifies red light ON and green light OFF for both PCV-444C & D.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

Note using the MCB indicators it is most likely that will terminate on RCS pressure < Ruptured ('C') S/G pressure and PZR level > 28%, but if using IPCS values it is more likely that will terminate on PZR level >69.

CR	SEQ		STEP STANDARD:
No	Yes	Use maximum available spray until any termination criteria is met; RCS pressure < Ruptured ('C') S/G pressure and PZR level > 28%; or PZR level >69; or RCS subcooling <67.5°F.	Recognizes from MCB indication that RCS pressure is less than 'C' S/G pressure with PZR level >18% or PZR level >68%, or RCS subcooling <30°F.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	Stop RCS depressurization.	Decreases PCV-444C & 444D controller output demand to zero. Notes that PCV-444D did not go closed.

COMMENTS:

SAT ______

UNSAT

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Identify failure of PCV-444D to close and secures 'A' RCP.	'A' RCP tripped to stop depressurization. Also stops either 'B' RCP or 'C' RCP if pressure continues to decrease..

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	No	Close PVT-8145	Verifies PVT-8145 green light ON and red light OFF

COMMENTS:

SAT ______

UNSAT

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPSF-007

DESCRIPTION: STEAM GENERATOR TUBE RUPTURE (DEPRESSURIZE RCS TO < RUPTURED S/G PRESSURE)

IC SET: 10

INSTRUCTIONS:

1. Activate

MAL-RCS002C SEVERITY=450 RAMP=30 (S/G Tube Rupture on 'C' S/G)

2. RUN

3. Carry out actions of AOP-112.2 until SI occurs.

4. Manual SI and perform actions of EOP-1.0 & EOP-4.0 up through step 3g.

5. Throttle EFW to 'C' S/G when level > 40%.

6. FREEZE

7. Activate

LOA-MSS033 SELECT=OPEN (RACK OUT BKR FOR MVG-2802B (STM SUPPLY TO TDEFP))

8. RUN

9. Perform actions of steps 3h-21 of EOP-4.0.

10. FREEZE

11. When student is ready:

RUN

12. After spray valve is started manually closed by student when depressurization termination criteria met, Activate:

MAL-PRS003B SEVERITY=100 RAMP=10 (PCV-444D STUCK OPEN)
Use conditional X05i049m > 0.9

COMMENTS:

This JPM can be run from the same snap as JPS007 with the addition of MAL-PRS003B = 100%

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPS-013**

RESPOND TO RCP #1 SEAL FAILURE

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 9

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-015-05-01 RESPOND TO REACTOR COOLANT PUMP (RCP) MOTOR MALFUNCTION

TASK STANDARD:

The reactor is tripped. 'A' RCP is secured. PVT-8141A closed within 5 minutes of securing of 'A' RCP.

TERMINATING CUE: Seal Injection flow is locally throttled to 13 gpm.

PREFERRED EVALUATION LOCATION SIMULATOR

PREFERRED EVALUATION METHOD PERFORM

REFERENCES:

AOP-101.2	REACTOR COOLANT PUMP SEAL FAILURE
ARP-001-XCP-617	PANEL XCP-617

INDEX NO.	*K/A NO.*		*RO*	*SRO*
003000A301	A3.01	Seal injection flow	3.3	3.2

TOOLS: AOP-101.2

EVALUATION TIME 15 ***TIME CRITICAL*** No ***10CFR55:*** 45(A)7

TIME START: ________ TIME FINISH: ________ PERFORMANCE TIME: ________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ________________ ____________ / ______

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: Plant is at 50% power with all controls in automatic.

INITIATING CUES: Respond as NROATC to developing plant conditions.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: Plant is at 50% power with all controls in automatic.

INITIATING CUES: Respond as NROATC to developing plant conditions.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Booth Operator: When called to install XVT-8141A-FU-CS75 use the LOA page to do so.

CR	SEQ		STEP STANDARD:
No	Yes	While continuing with this procedure, have an operator install the pre-staged fuses for the AFFECTED RCP's Seal Leakoff Valve in Main Control Board Panel XCP-6109 Subpanel: XVT-8141A-FU-CS75. XVT-8141B-FU-CS76. XVT-8141C-FU-CS77.	Calls the control building operator to install XVT-8141A-FU-CS75.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	SEQ		STEP STANDARD:
No	No	Ensures 'A' RCP seal injection flow rate >8 gpm.	#1 seal injection >8 gpm on FI-130A.

COMMENTS:

SAT

UNSAT ______

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
No	No	Ensure CCW flow to 'A' RCP thermal barrier is satisfactory.	FM-7138, RCP THERM BAR 'A', indicates 50%-87.5%.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

Examinee may determine 'A' RCP temperatures are significantly increasing in either step 3 or 4.

CR	*SEQ*		*STEP STANDARD:*
Yes	No	Checks lower seal water outlet temp < 225°F and not significantly increasing.	Determines Lower Seal Water Bearing Temp. >225°F and/or significantly increasing.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	No	Checks #1 seal leakoff temperature <235°F and not significantly increasing.	Determines Seal Water Outlet Temp. >235°F and/or significantly increasing.

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	No	Checks reactor power >38% and/or P-8 dim.	Determines from NI reactor power <50% and P-8 dim.

COMMENTS:

SAT ______

UNSAT

STEP: 7

CUES:

Examiner: If examinee starts the immediate actions for EOP-1.0 following the reactor trip, prompt him/her that the BOP will perform those actions and all other actions in EOP-1.0. He/she should continue in AOP-101.2

CR SEQ ***STEP STANDARD:***

Yes Yes Trips the Reactor.

'A' & 'B' RTBs indicate red light OFF, green light ON. All rod bottom lights lit.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR SEQ ***STEP STANDARD:***

Yes Yes Secures RCP 'A'.

'A' RCP indicates green light OFF, red light ON, zero amps.

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

PVT-8141A must be closed within 3-5 minutes of the securing of the RCP. Student should set timer for closing 8141A.

CR SEQ ***STEP STANDARD:***

Yes Yes Closes #1 seal leakoff valve.

PVT-8141A, A SEAL LKOFF indicates red light OFF, green light ON within 3 - 5 minutes of securing the RCP..

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

The JPM can be ended as soon as the request to throttle seal injection is made.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Requests building operator (ABLL) to set seal injection flow to 13 gpm by throttling XVN-08369A	Calls local operator to throttle XVN-08368A to obtain seal injection flow of 13 gpm.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPS-013

DESCRIPTION: RESPOND TO RCP #1 SEAL FAILURE

IC SET: 12

INSTRUCTIONS:

1. When student is ready:

   RUN

2. Activate

   MAL-CVC004A SEVERITY = 40 RAMP = 1:00 ('A' RCP #1 seal failure)

3. When called to install the fuse for XVT-8141A-FU-CS75 use the LOA to do so.

COMMENTS:
NONE

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPS-149A**

RESPONSE TO STEAM GENERATOR
OVERPRESSURE IAW EOP-15.3

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 0

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

311-006-06-01 RESPONSE TO LOSS OF SECONDARY HEAT SINK

TASK STANDARD:

"A" S/G pressure has been lowered to ~1050 psig

TERMINATING CUE: "A" S/G pressure is returned to normal

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
SIMULATOR	PERFORM

REFERENCES: EOP-15.3 RESPONSE TO LOSS OF NORMAL STEAM RELE CAPABILITIES

INDEX NO.	***K/A NO.***		***RO***	***SRO***
0410002120	2.1.20	Ability to interpret and execute procedure steps.	4.6	4.6

TOOLS: EOP-15.3

EVALUATION TIME 10 ***TIME CRITICAL*** NO ***10CFR55:*** 55.45.b.6

TIME START: __________ TIME FINISH: __________ PERFORMANCE TIME: ________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: __________________ __________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITION: The plant has tripped due to a inadvertent main steam line isolation. A yellow path exists for a transition to EOP-15.3, RESPONSE TO LOSS OF NORMAL STEAM RELEASE CAPABILITIES.

INITIATING CUES: The CRS directs you to implement EOP-15.3.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: NONE

INITIAL CONDITION: The plant has tripped due to a inadvertent main steam line isolation. A yellow path exists for a transition to EOP-15.3, RESPONSE TO LOSS OF NORMAL STEAM RELEASE CAPABILITIES.

INITIATING CUES: The CRS directs you to implement EOP-15.3.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Identify any SG with pressure GREATER THAN 1170 psig.	Operator determines "A" is greater than 1170 psig.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

IC was snapped with the condenser available (and so it is not a faulted JPM). If candidate delays actions so that C-9 is no longer bright the alternate action to release steam via the "A" PORV may also be used to reduce pressure.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Verify PERMISV C-9 status light is bright on XCP-6114 1-3.	Operator locates and verifies C-9 is bright on XCP-6114 1-3.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

NOTE: MS Isolation Bypass Valves, PVM-2869A(B)(C) require two hand operation to open. The common "B" train switch has to be held to open while the individual "A" train switches are operated.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Verify the MS Isolation Valves, PVM-2801A(B)(C), are open. OR Open MS Isolation Bypass Valves: 1) Depress both MAIN STEAM ISOL VALVES RESET TRAIN A(B). 2) Open MS Isolation Bypass Valves, PVM-2869A(B)(C).	Determines that MS Isolation Valves, PVM-2801A(B)(C), are closed. Depresses both MAIN STEAM ISOL VALVES RESET TRAIN A(B). Opens MS Isolation Bypass Valves, PVM-2869A(B)(C) and verifies red light lit green light dim.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Place the STM DUMP CNTRL Controller in MAN and closed.	Operator locates and places STM DUMP CNTRL Controller in MAN and closed.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

NOTE: IC was snapped with controller already at 8.4.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure the STM DUMP CNTRL Controller is set to 8.4 (1090 psig).	STM DUMP CNTRL Controller is set to 8.4 (1090 psig).

COMMENTS:

SAT ______

UNSAT

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Place the STM DUMP MODE SELECT Switch in STM PRESS.	STM DUMP MODE SELECT Switch is in STM PRESS.

COMMENTS:

SAT ______

UNSAT

STEP: 7

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place the STM DUMP CNTRL Controller in AUTO.	STM DUMP CNTRL Controller is in AUTO.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Verify Condenser Steam Dumps are open.	Bank 1 of Condenser Steam Dumps show at least intermediate position (red and green lights lit).

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Verify SG pressures are LESS THAN 1170 psig.	Determines the "A" steam generator is now <1170 psig.

COMMENTS:

SAT ______

UNSAT

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPS-149A

DESCRIPTION: RESPONSE TO STEAM GENERATOR OVERPRESSURE IAW EOP-15.3

IC SET: 10

INSTRUCTIONS:

Use a inadvertent closure of all the mainsteam lines (at once to preclude a SI where it would be less likely to direct the completion of a yellow path).
Using failures of the steam release capability of the "A" steam generator ensure that pressure goes up to between 1230 and 1170 and ensure a yellow path exists to EOP-15.3.
Ensure that the snap is generated fast enough to ensure that C-9 remains bright.

FREEZE

When the candidate is ready go to RUN.

When snapping into IC set verify that all S/G PORV's are set to 8.4 exactly.

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPSF-160**

Respond to electrical grid issues.

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 0

CANDIDATE: ______________________

EXAMINER: ______________________

THIS JPM IS APPROVED

DRAFT

TASK:

064-003-01-01 LOAD THE DIESEL GENERATOR

TASK STANDARD:

Determines that 1DB voltage is too low and starts the 'B' Diesel Generator. When the diesel generator is ready for load opens the normal incoming breaker for 1DB.

TERMINATING CUE: 1DB is being supplied power from the diesel.

PREFERRED EVALUATION LOCATION SIMULATOR

PREFERRED EVALUATION METHOD PERFORM

REFERENCES:

INDEX NO.	*K/A NO.*		*RO*	*SRO*
0000772119	2.1.19	Ability to use plant computers to evaluate system or component status.	3.9	3.8
0000772120	2.1.20	Ability to interpret and execute procedure steps.	4.6	4.6

TOOLS: AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES

EVALUATION TIME 10 ***TIME CRITICAL*** NO ***10CFR55:*** 55.45.b.3

TIME START: ______ TIME FINISH: ______ PERFORMANCE TIME: ______

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ____________________ ____________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: 100% Power. A grid instability condition exists. The crew has entered AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES, and has performed steps 1 and 2.

INITIATING CUES: The CRS directs you as the BOP to perform steps 3 through 6 of , AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None.

INITIAL CONDITION: 100% Power. A grid instability condition exists. The crew has entered AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES, and has performed steps 1 and 2.

INITIATING CUES: The CRS directs you as the BOP to perform steps 3 through 6 of , AOP-301.1, RESPONSE TO ELECTRICAL GRID ISSUES.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check that a Turbine Runback is NOT required.	Verifies that the following annunciators are NOT in alarm. OP Delta T OT Delta T Verifies that the following status lights are dim. PERMISV C-7A PB-447A. PERMISV C-7B PB-447B. OT DELTA T C-3 (XCP-6109 1-29). OP DELTA T C-4 (XCP-6109 1-31).

COMMENTS:

SAT ______

UNSAT

STEP: 2

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Monitor Main Turbine and Generator for proper operation.	Monitors turbine using AOP301 or TURBRG on IPCS

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure Main Generator MVAR loading is within the limits of the Estimated Generator Capability Curve.	Determines that MVARS are ~305 and uses Attachment 2 or AOP301 on IPCS to determine that MVARS are within limits.

COMMENTS:

SAT

UNSAT ______

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check if Bus 1DA voltage is greater than 6840 volts.	Finds 1DA voltage and determines that it is normal.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

Note: This is when this JPM becomes faulted.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Check if Bus 1DB voltage is greater than 6840 volts.	Determines that voltage is less than 6840 volts.

COMMENTS:

SAT

UNSAT ______

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Ensure Diesel Generator 'B' has started in the Emergency Mode.	Depresses, DG 'B' Control, EMERG START pushbutton.

COMMENTS:

SAT

UNSAT ______

STEP: 7

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check if Annunciator XCP-640 3-2 is lit (DG A READY FOR LOAD).	Verifies that XCP-640 3-2 is lit.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Ensure the normal and alternate feeder breakers to 1DB are open.	Opens BUS 1DB NORM FEED Breaker.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPSF-160

DESCRIPTION: Respond to electrical grid issues.

IC SET: 10

INSTRUCTIONS:

1. Insert malfuctions:
MAL-EPS006B, DIESEL GENERATOR B FAILURE Set= NO_AUTO_START
MAL-EPS020, DEGRADED GRID VOLTAGE Set=14
2. Insert overrides:
IND-DG018, V-1DB 1DB BUS VMTR METER SIGNAL Set =6465
IND-ES006, V-1A 1A BUS VOLTMTR METER SIGNAL Set=6742.12
IND-ES007, V-1B 1B BUS VOLTMTR METER SIGNAL Set=6768.1
IND-ES009, V-1C 1C BUS VOLTMTR METER SIGNAL Set=6780
Note: the numbers do not truly indicate actual voltage reading on simulator so verify that 1DB is <6840 volts.
3. Lower MVAR to <325 MVARS.
4. Run until you get 230 V HI/LO volta alarm.
5. When canidate is ready go to run.

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPPF-049**

CONTROL ROOM EVACUATION (DUTIES OF BOP OPERATOR)

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 4

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-068-05-01 PERFORM CONTROL ROOM EVACUATION

TASK STANDARD:

AOP-600.1 Attachment II performed with the following complete:
1. All MFPs have been tripped
2. Rod Drive MG set feeder breakers have been tripped
3. RCP "B" or "C" Breaker has been tripped ('A' RCP is tripped already)
4. Two condensate pumps have been tripped
5. Three FWBP's have been tripped.

The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: Step 12 of Attachment II is complete or when examinee returns procedure to examiner.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
PLANT	SIMULATE

REFERENCES:

SOP-313	LOCAL SWITCHGEAR BREAKER OPERATIONS
ISP-027	ELECTRICAL SAFETY
AOP-600.1	CONTROL ROOM EVACUATION

INDEX NO.	***K/A NO.***		***RO***	***SRO***
0000682130	2.1.30	Ability to locate and operate components, including local controls.	4.4	4.0

TOOLS: AOP-600.1, Attachment II, Steps 10-12
ISP-027 Electrical Safety
SOP-313

EVALUATION TIME 14 ***TIME CRITICAL*** No ***10CFR55:*** 45(a)13

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ______________________ ______________________ / __________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is operating at 100% power, with all controls in automatic. A bomb threat has been received in the control room. The SS has directed a control room evacuation. AC power is available to both ESF Buses.

INITIATING CUES: The Control Room Supervisor directs the BOP Operator to perform Attachment 2 of AOP-600.1, Steps 10 through 12.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is operating at 100% power, with all controls in automatic. A bomb threat has been received in the control room. The SS has directed a control room evacuation. AC power is available to both ESF Buses.

INITIATING CUES: The Control Room Supervisor directs the BOP Operator to perform Attachment 2 of AOP-600.1, Steps 10 through 12.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Examiner cues examinee that the reactor has been tripped.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Verifies reactor has been tripped.	Calls the reactor operator and verifies reactor has been tripped.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Locally trip all MFPs (436' TB).	Pulls MFP "PULL TO TRIP" handle on front standard for MFP's "A" "B" & "C". Verifies trip by noting RPM decrease locally OR trips MFPs from local DCS station.

COMMENTS:

SAT ______

UNSAT

STEP: 3

CUES:

Note: Shift Supervisor may waive ISP-027 requirements during Emergency Operations. Hard hat (as posted); safety glasses, hearing protection (as posted); FR Pants and shirt or FR coveralls. Instructor provides feedback of "no change in status" if examinee indicates he/she would trip a 480V breaker using the TRIP Pushbutton on the right side of the breaker. This p/b only works when the breaker is racked out to the "test" position.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Trips ROD DRIVE M/G SET "B" - XMG0001B-CR, XSW1B1 06C.	Trips rod drive MG set "B" bkr 06C at XSW-1B1 by pushing on red TRIP pushbutton on left side on front of breaker. Verifies a green "OPEN" flag results and red light OFF, green light ON

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

Examiner informs examinee that the "A" FWBP, bkr 06 red light is lit.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check status of XSW1A 06 FD WTR BOOSTER PUMP A XPP0028A-FW breaker.	Verifies that the "A" FWBP, bkr 06 is closed by observing red light on outside of cubicle door.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

Cue examinee that RCP "A" Bkr has a green light lit on front of cubicle. (Note: This will "setup" alternate path portion of this JPM. Examinee will have to leave either 'B' or 'C' RCP running in Step 12.c.)

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Checks status of XSW1A 09, Rx COOLANT PUMP A XPP0030A-RC.	Checks RCP "A" breaker at XSW1A 09. Verifies a green light on outside of cubicle door.

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

Examiner informs examinee that the "A" condensate pump breaker red light is lit.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check status of XSW1A 07, COND PUMP A XPP0042A-CO breaker.	Verifies that the "A" condensate pump bkr 07 is closed by observing red light or outside of cubicle door.

COMMENTS:

SAT

UNSAT ______

STEP: 7

CUES:

Note: Shift Supervisor may waive ISP-027 requirements during Emergency Operations. 25 Cal/cm2, arc flash suit and hood (use of an arc flash hood without a hard hat in an area with overhead work in progress will require manager approval. Otherwise no hard had is required when in an arc flash hood). Short sleeve natural fiber shirt, voltage rated gloves, safety glasses, earmuffs are the preferred hearing protection when an arc flash suit is being worn, however earplugs may be used. FR coveralls or FR Shirt (tucked in) & Pants. A 10' flash protection boundary is established.

CR	SEQ		STEP STANDARD:
Yes	Yes	Trips XSW1B 09, COND PUMP B XPP0042B-CO breaker.	Trips breaker XSW1B 09 for Cond Pump "B" by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies a green light on outside of cubicle door results.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

Examiner informs examinee the cubicle for COND PUMP C XPP0042C has a green light lit on the front of the cubicle.

CR	SEQ		STEP STANDARD:
No	Yes	Checks status of XSW1C 06, COND PUMP C XPP0042C-CO breaker.	Checks COND PUMP C Breaker, XSW01C 06. Verifies a green light ON outside of cubicle door.

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

Same ISP-27 considerations as Condensate pumps.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Trips XSW1B 06, FD WTR BOOSTER PUMP B XPP0028B-FW breaker.	Trips the FWBP "B" bkr 06 manually at XSW-1B by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies a green light on outside of cubicle door results.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

Same ISP-27 considerations as Condensate pumps.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Trips XSW1B 13, FD WTR BOOSTER PUMP D XPP0028D-FW breaker.	Trips the FWBP "D" bkr 13 manually at XSW-1B by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies a green light on outside of cubicle door results.

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

Same ISP-27 considerations as Condensate pumps.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Trips XSW1C 08, FD WTR BOOSTER PUMP C XPP0028C-FW breaker. the FWBP "C" breaker.	Trips the FWBP "C" bkr 08 manually at XSW-1C by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies a green light on outside of cubicle door results.

COMMENTS:

SAT

UNSAT ______

STEP: 12

CUES:

This is the alternative path portion of this JPM.
Same ISP-27 considerations as Condensate pumps.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Trips XSW1B 07, Rx COOLANT PUMP B XPP0030B-RC "OR" XSW1C 03, Rx COOLANT PUMP C XPP0030C-RC breaker.	Trips the RCP "B" bkr 07 at XSW-1B (OR RCP "C" bkr 03 at XSW-1C) by pushing the "MANUAL TRIP" lever on front of breaker (inside cubicle door). Verifies a green light on outside of cubicle door results.

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

Same ISP-27 considerations as Condensate pumps if it was to be operated but since only verifying proper position there are no ISP-27 requirements.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure XSW 1C 02 Press Heater Transformer XTF 4103-RC is closed.	Verifies that the PZR Heater Transformer Breaker 02 at XSW-1C is closed by observing red light on outside of cubicle door or a red "closed" flag on front of breaker.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPPF-049

DESCRIPTION: CONTROL ROOM EVACUATION (DUTIES OF BOP OPERATOR)

IC SET:

INSTRUCTIONS:

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPPF-044**

CONTROL ROOM EVACUATION (Followup Actions of CRS)

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 13

CANDIDATE: ______________________________

EXAMINER: ______________________________

SRO ONLY

THIS JPM IS APPROVED

DRAFT

TASK:

000-068-05-01 PERFORM CONTROL ROOM EVACUATION

TASK STANDARD:

Flow has been established to the RCS and the S/Gs. SW is running to cool D/G's & CCW on both trains. The RCS is emergency borated. The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations.

TERMINATING CUE: Emergency boration is completed or emergency boration is (incorrectly) deemed "not required" or when examinee returns procedure to examiner

PREFERRED EVALUATION LOCATION PLANT

PREFERRED EVALUATION METHOD SIMULATE

REFERENCES: AOP-600.1 CONTROL ROOM EVACUATION

INDEX NO.	*K/A NO.*		*RO*	*SRO*
000068K318	AK3.18	Actions contained in EOP for control room evacuation emergency task	4.2	4.5
000068K309	AK3.09	Transfer of the following to local control: charging pumps, charging header flow control valve, PZR heaters, and boric acid transfer pumps	3.9	4.4

TOOLS: AOP-600.1, BEGINNING WITH STEP 4

EVALUATION TIME 25 ***TIME CRITICAL*** No ***10CFR55:*** 45(a)13

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: _____ UNSAT: _____

EXAMINER: ______________________ ______________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A control room evacuation has occurred due to bomb threat in the Control Room. Bomb detection experts from the State Law Enforcement are on their way to the site.

INITIATING CUES: The Shift Supervisor directs CRS to perform AOP-600.1 at the CREP, beginning with Step 4.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A control room evacuation has occurred due to bomb threat in the Control Room. Bomb detection experts from the State Law Enforcement are on their way to the site.

INITIATING CUES: The Shift Supervisor directs CRS to perform AOP-600.1 at the CREP, beginning with Step 4.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Steps 1 - 21 are performed in 'A' CREP Room.

CR	SEQ		STEP STANDARD:
Yes	Yes	Set FCV-122, CHG FLOW, potentiometer to 5.0.	Rotates the potentiometer wheel clockwise until 5 appears in the window.(5 full turns).

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	Set IFV-3536, TD EFP to SG A, potentiometer fully clockwise.	Rotates IFV-3536 potentiometer clockwise until no further rotation can be made.

COMMENTS:

SAT ______

UNSAT

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	Set IFV-3546, TD EFP to SG B, potentiometer fully clockwise.	Rotates IFV-3546 potentiometer clockwise until no further rotation can be made.

COMMENTS:

SAT ______

UNSAT

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Set IFV-3556, TD EFP to SG C, potentiometer fully clockwise.	Rotates IFV-3556 potentiometer clockwise until no further rotation can be made.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place LCV-459, LTDN LINE ISOL, in OPEN.	Positions the LCV-459 control switch to the OPEN position.

COMMENTS:

SAT ______

UNSAT

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place LCV-460, LTDN LINE ISOL, in OPEN.	Positions the LCV-460 control switch to the OPEN position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place two letdown orifices in OPEN and one in CLOSE	Positions two of three LTDN ORIFICE (A,B,C) ISOL control switches to the OPEN position. Ensures one is positioned to CLOSE.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place TSC BYPASS in ON	Positions the TSC BYPASS switch to the ON position.

COMMENTS:

SAT ______

UNSAT

STEP: 9

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	At the Auxiliary Panel, place PCV-445A, PORV in CLOSE.	Verifies the PCV-445A control switch is in the CLOSE position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

After switch placed in LOCAL, cue operator that red light is lit on PZR HTRS BU GROUP 1.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PZR HTRS BU GROUP 1 XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

Potential but not definite change in FI-122B.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	FCV-122, CHG FLOW CNTRL XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 12

CUES:

After switch placed in LOCAL, cue operator that red light is lit on SW PUMP A

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	XPP-0039A, SW PUMP A XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

After switch placed in LOCAL, cue operator that no lights are lit on SW Pump C.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	XPP-0039C, SW PP C TRAIN A XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 14

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	TD EFP FD VLV XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 15

CUES:

After switch placed in LOCAL, cue operator that red light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	LCV-459, LTDN LINE ISOL XFER to LOCAL.	Positions transfer switch from REMOTE to LOCAL

COMMENTS:

SAT

UNSAT ______

STEP: 16

CUES:

After switch placed in LOCAL, cue operator that red light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	LCV-460, LTDN LINE ISOL XFER to LOCAL.	Positions transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 17

CUES:

After switch placed in LOCAL, cue operator that red light is lit if selected to open, green light is lit if 8149A selected to CLOSED.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PVT-8149A, LTDN LINE A ISOL XFER to LOCAL.	Positions transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 18

CUES:

After switch placed in LOCAL, cue operator that red light is lit if selected to open, green light is lit if selected to close.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PVT-8149B, LTDN LINE B ISOL XFER to LOCAL.	Positions transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 19

CUES:

After switch placed in LOCAL, cue operator that red light is lit if selected to open, green light is lit if selected to close.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PVT-8149C, LTDN LINE C ISOL XFER to LOCAL.	Positions transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 20

CUES:

After switch placed in LOCAL, cue operator that green light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PCV-445A, PORV XFER (Auxiliary Panel) to LOCAL.	Positions transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 21

CUES:

Examiner cues operator that SW pump breaker for SW Pump A indicator red light is lit.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure one S.W. pump running on Train A (CREP A)	Verifies SW pump "A" red light lit.

COMMENTS:

SAT ______

UNSAT ______

STEP: 22

CUES:

Steps 22 - 48 performed in 'B' CREP Room.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Set IFV-3531, MD EFP TO SG A potentiometer fully clockwise	Rotates IFV-3531 potentiometer clockwise until no further rotation can be made.

COMMENTS:

SAT ______

UNSAT ______

STEP: 23

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Set IFV-3541, MD EFP TO SG B potentiometer fully clockwise	Rotates IFV-3541 potentiometer clockwise until no further rotation can be made.

COMMENTS:

SAT ______

UNSAT ______

STEP: 24

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Set IFV-3551, MD EFP TO SG C potentiometer fully clockwise	Rotates IFV-3551 potentiometer clockwise until no further rotation can be made.

COMMENTS:

SAT

UNSAT ______

STEP: 25

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Place XPP-13B, BA XFER PUMP B in OFF	Verifies the B.A. Transfer Pump "B" control switch in OFF.

COMMENTS:

SAT ______

UNSAT ______

STEP: 26

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place XVT-8152, LTDN ISOL in OPEN	Positions the XVT-8152 control switch to OPEN.

COMMENTS:

SAT

UNSAT ______

STEP: 27

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place PVG-2030, STEAM TO TD EFP in OPEN	Positions the XVT-2030 control switch to OPEN.

COMMENTS:

SAT ______

UNSAT ______

STEP: 28

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Place TSC BYPASS in ON	Positions the TSC BYPASS Switch to the ON position.

COMMENTS:

SAT ______

UNSAT

STEP: 29

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	At the Auxiliary Panel, place PORV PCV-444B in CLOSE	Verifies the PCV-444B control switch is in CLOSE.

COMMENTS:

SAT ______

UNSAT ______

STEP: 30

CUES:

After switch placed in LOCAL, cue operator that the green light is lit.

CR	SEQ		STEP STANDARD:
Yes	Yes	PZR HTRS BU GROUP 2 XFER to LOCAL	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT

UNSAT ______

STEP: 31

CUES:

After switch placed in LOCAL, cue operator that the green light is lit.

CR	SEQ		STEP STANDARD:
Yes	Yes	MVT-8104, EMERG BA FLOW CNTRL XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT

UNSAT ______

STEP: 32

CUES:

After switch placed in LOCAL, cue operator that the red light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	XPP-0039B, SW PUMP B XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 33

CUES:

After switch placed in LOCAL, cue operator that no lights are lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	XPP-0039C, SW PUMP C TRAIN B XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 34

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	MD EFP FEED VALVES XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 35

CUES:

After switch placed in LOCAL, cue operator that the green light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	XPP-13B, BA PUMP B XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 36

CUES:

After switch placed in LOCAL, cue operator that the red light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	XVT-8152, LTDN ISOL XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 37

CUES:

After switch placed in LOCAL, cue operator that the red light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PVG-2030, STEAM TO TD EFP XFER to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 38

CUES:

After switch placed in LOCAL, cue operator that green light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	PCV-444B, PORV XFER (Auxiliary Panel) to LOCAL.	Positions the transfer switch from REMOTE to LOCAL

COMMENTS:

SAT ______

UNSAT ______

STEP: 39

CUES:

Examiner cues operator that SW pump breaker indicator red light is lit.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensures one SW pump running on Train B (CREP B)	Verifies the SW PUMP "B" red light lit.

COMMENTS:

SAT ______

UNSAT ______

STEP: 40

CUES:

After examinee looks at NI-36A (located on the A crep panel XPN-7200A) cue operator that NROATC tripped the Reactor 27 minutes ago and Intermediate Range power is 1x10-7% power. If examinee asks for specific source range counts, inform examinee that NI-32A reads 100 counts.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check if N-33 can be aligned.	Determines sufficient time has passed to align N-33.

COMMENTS:

SAT ______

UNSAT ______

STEP: 41

CUES:

If examinee asks for specific source range counts, inform examinee that NI-33 reads 1,000 counts.

CR	SEQ		STEP STANDARD:
Yes	Yes	On XPN7300, place INI-0033, N33 DET HIGH VOLTAGE Switch in ON	Positions the switch to ON position as indicated by red light lit.

COMMENTS:

SAT ______

UNSAT ______

STEP: 42

CUES:

Rod F10 indicated 18 steps, and rod K2 indicated 96 steps prior to leaving the Control Room.
NOTE: This is where this JPM becomes faulted.

CR	SEQ		STEP STANDARD:
No	Yes	Check if Emergency boration is required.	Checks for plant conditions which would require emergency boration from chart ir AOP-600.1

COMMENTS:

SAT ______

UNSAT ______

STEP: 43

CUES:

After switch placed in OPEN, cue operator that red light is lit.

CR	SEQ		STEP STANDARD:
Yes	Yes	Open MVT-8104 EMERG BA FLOW CNTRL	Rotates control switch to OPEN position

COMMENTS:

SAT ______

UNSAT

STEP: 44

CUES:

After switch placed in START, cue operator that red light is lit.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Start XPP-13B, BA XFER PUMP B	Rotates control switch to START positior

COMMENTS:

SAT ______

UNSAT ______

STEP: 45

CUES:

Cue operator that FI-110A indicates 100 GPM

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Verify flow on FI-110A, EMERGENCY BA FLOW GPM	Checks indication on FI-110A EMERGENCY BA FLOW GPM

COMMENTS:

SAT

UNSAT ______

STEP: 46

CUES:

Cue operator that 25 minutes have elapsed since he opened MVT-8104 was opened.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Verify required boration is completed.	Notes that it will take 25 minutes for required boration.

COMMENTS:

SAT ______

UNSAT ______

STEP: 47

CUES:

Cue operator that the green light is lit

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	CLOSE MVT-8104, EMERG BA FLOW CNTRL.	Rotates control switch to CLOSE positioı

COMMENTS:

SAT ______

UNSAT ______

STEP: 48

CUES:

Cue operator that the green light is lit

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Stop XPP-13B , BA XFER PUMP B	Rotates control switch to OFF position

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPPF-044

DESCRIPTION: CONTROL ROOM EVACUATION (Followup Actions of CRS)

IC SET:

INSTRUCTIONS:

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPP-205**

CROSS TRAIN CONNECTION OF BATTERY CHARGER XBC1A-1B (ALIGNING AC FROM TRAIN A AND DC TO TRAIN B)

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 1

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

TASK:

063-007-01-04 PLACE A BATTERY CHARGER IN SERVICE

TASK STANDARD:

The use of applicable Human Performance Tools (3-way communications, self checking, peer checking, phonetic alphabet, etc) and industrial safety practices meets expectations. AC input from XMC-1DA2Y is aligned to battery charger XBC1A-1B. DC output from XBC1A-1B is aligned to Train B.

TERMINATING CUE: Enclosure K is complete or student hands JPM back to examiner.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
PLANT	SIMULATE

REFERENCES: FEP-2.0 TRAIN A PLANT SHUTDOWN TO HOT STANDBY

INDEX NO.	***K/A NO.***		***RO***	***SRO***
000068A110	AA1.10	Power distribution: ac and dc	3.7	3.9

TOOLS: FEP-2.0, Enclosure E page 3 and K
FEP-2.0
FLASHLIGHT

EVALUATION TIME 15 ***TIME CRITICAL*** NO ***10CFR55:*** 45(a)8

TIME START: ________ TIME FINISH: ________ PERFORMANCE TIME: ________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ________________ ________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: 90 minutes ago, the plant was at 100% power when a fire occurred in Fire Zone IB-25.4. The Shift Supervisor directed the CRS to implement the FEPs and the CRS has subsequently selected FEP-2.0 based on the location of the fire. The Control Room Supervisor has directed you, as the AB Upper Level, to perform Enclosure E of FEP-2.0. You have successfully completed the enclosure through Step 5.

INITIATING CUES: The CRS now directs you to complete FEP-2.0, Enclosure E, Step 6, Align the 1A-1B Battery Charger per Enclosure K.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: 90 minutes ago, the plant was at 100% power when a fire occurred in Fire Zone IB-25.4. The Shift Supervisor directed the CRS to implement the FEPs and the CRS has subsequently selected FEP-2.0 based on the location of the fire. The Control Room Supervisor has directed you, as the AB Upper Level, to perform Enclosure E of FEP-2.0. You have successfully completed the enclosure through Step 5.

INITIATING CUES: The CRS now directs you to complete FEP-2.0, Enclosure E, Step 6, Align the 1A-1B Battery Charger per Enclosure K.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Prompt candidate that XVC1A-1B, SWING BATTERY CHARGER is OPERABLE.

CR	SEQ		STEP STANDARD:
No	Yes	Verify that XBC1A-1B, SWING BATTERY CHARGER, is not supplying DPN-1HA (TRAIN A-DC breaker is OFF).	On XBC1A-1B, ensures the Train A-DC breaker is OFF (pointing down).

COMMENTS:

SAT ______

UNSAT ______

STEP: 2

CUES:

Breakers move freely in down direction to "OFF".

CR	SEQ		STEP STANDARD:
No	Yes	Open both TRAIN A-AC and TRAIN B-AC breakers and both TRAIN A-DC and TRAIN B-DC breakers on XET-4003.	At XET-4003, opens both Train A-AC and Train B-AC and both Train A-DC and Train B-DC breakers (pointing down) to the "OFF" position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	Insert the spare interlock key into the TRAIN A-AC or TRAIN B-DC interlock key slot on XET-4003 and bypass the interlock.	Operator inserts spare interlock key into either TRAIN A-AC or TRAIN B-DC interlock key slot on XET-4003 and places switch in "OFF".

COMMENTS:

SAT ______

UNSAT

STEP: 4

CUES:

Breakers move freely in up direction.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Close the TRAIN A-AC breaker on XET-4003.	Operator positions TRAIN A-AC breaker upward to the "ON" position on XET-4003.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

Breaker moves freely in up direction.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Close the TRAIN B-DC breaker on XET-4003.	Operator positions TRAIN B-DC breaker upward to the "ON" position on XET-4003.

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Open DPN-1HA-ED 13, BATTERY CHARGER 1A-1B FEED TO DPN1HA.	Operator places breaker 13 (BATTERY CHARGER 1A-1B FEED TO DPN1HA) in DPN-1HA-ED to the LEFT (OFF) position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

Breaker moves freely upward to the "ON" position

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Close the following on XBC1A-1B Battery Charger: DC OUTPUT(CB2); AC INPUT (CB1) on the left side.	Operator places breakers DC OUTPUT and AC INPUT to the "UP" position on XBC1A-1B Battery Charger.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

Examiner uses pen or pencil to point to 135 volts on the "DC OUTPUT" VOLTMETER (half way between 120 & 150 marks).

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Verify DC OUTPUT VOLTMETER stabilizes between 129 and 140 volts.	Operator checks that DC OUTPUT VOLTMETER stabilizes between 129 and 140 volts.

COMMENTS:

SAT

UNSAT ______

STEP: 9

CUES:

If sufficient time elapses to charge the capacitors it is not critical to verify output.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Verify the capacitors are fully charged by observing that the red indicator lights on XPN5294 ED, BATT CHARGER CAP BOX, are illuminated.	After 5-10 seconds (per NOTE 9), operator verifies red indicator lights for the capacitors are lit on XPN-5294-ED.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Close DPN-1HB-ED 13, BATTERY CHARGER 1A-1B FEED TO DPN1HB.	Operator places breaker 13 on DPN-1HB-ED to right ("ON") position.

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

Examiner, as Control Room repeats back communication. (Ensure 3-way communication is used.)

CR	***SEQ***		***STEP STANDARD:***
No	No	Notify the Control Room that XBC1A 1B is cross connected.	Operator reports XBC1A-1B is cross connected to Control Room, using expected communications techniques.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPP-205

DESCRIPTION: CROSS TRAIN CONNECTION OF BATTERY CHARGER XBC1A-1B (ALIGNING AC FROM TRAIN A AND DC TO TRAIN B)

IC SET:

INSTRUCTIONS:

COMMENTS:

DPN-1HA-ED odd breaker #'s on left, even BKR # on right. All "OFF" positions on outside and all "ON" positions on the inside. BKR 16, 22, 26, & 17 use international symbols of 'I' for "on/closed" & '0' for "off or open".

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPP-408**

ALIGN SPENT FUEL COOLING LOOP B TO RETURN REFUELING CAVITY WATER TO THE RWST

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 0

CANDIDATE: ____________________

EXAMINER: ____________________

THIS JPM IS APPROVED

TASK:

344-042-03-02 DIRECT CORRECTIVE ACTIONS TO MITIGATE THE CONSEQUENCES OF THE OFF NORMAL EVENT

TASK STANDARD:

Water is aligned so that it can be transferred to the RWST from the refueling cavity.

TERMINATING CUE: Attachment 1 of AOP-115.4 is complete or candidate turns in JPM sheet.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
PLANT	SIMULATE

REFERENCES:

INDEX NO.	***K/A NO.***		***RO***	***SRO***
0330002120	2.1.20	Ability to interpret and execute procedure steps.	4.6	4.6

TOOLS: AOP-115.4, Attachment 1.

EVALUATION TIME 30 ***TIME CRITICAL*** NO ***10CFR55:*** 55.45.b.8

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ______________________ ______________________ / ______

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: Some components are located in high radiation/ contaminated areas, do NOT break the plane of the postings.

INITIAL CONDITION: Plant is in MODE 6. Refueling was occurring when all RHR was lost and was not able to be return to service. Containment Integrity has been established. Cold leg injection from the 'A' Charging pump has been established. The Spent Fuel Pool Gate has been installed.

INITIATING CUES: The CRS directs you to Align Spent Fuel Cooling Loop B to return Refueling Cavity water to the RWST by performing AOP-115.4 Attachment 1.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

FOR ELECTRICAL MANIPULATIONS, AT NO TIME ARE YOU TO BREAK THE PLANE OF THE ELECTRICAL PANEL!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: Some components are located in high radiation/ contaminated areas, do NOT break the plane of the postings.

INITIAL CONDITION: Plant is in MODE 6. Refueling was occurring when all RHR was lost and was not able to be return to service. Containment Integrity has been established. Cold leg injection from the 'A' Charging pump has been established. The Spent Fuel Pool Gate has been installed.

INITIATING CUES: The CRS directs you to Align Spent Fuel Cooling Loop B to return Refueling Cavity water to the RWST by performing AOP-115.4 Attachment 1.

AT NO TIME ARE YOU TO OPERATE ANY PLANT EQUIPMENT!

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

If candidate asks status of Spent Fuel Cooling report from the control room that A is in service and B is secured.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Check if Spent Fuel Cooling Loop A is operating and if Loop B is shutdown.	Calls control room and using three-way communication asks status of Spent Fuel Cooling or goes to the Spent Fuel Cooling pumps and determines that XPP0032A-SF, SPENT FUEL PIT COOLING PUMP A, is running and XPP0032B-SF, SPENT FUEL PIT COOLING PUMP B, is secured.

COMMENTS:

SAT ______

UNSAT ______

STEP: 2

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Open XVB09624B-CC, SPENT FUEL HT EXCH B CC WTR INLET VALVE (AB-388).	Verifies that valve is open by rotating handwheel completely counter-clockwise.

COMMENTS:

SAT

UNSAT ______

STEP: 3

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Ensure XVB09628B, CC SPENT FUEL HT EXCH B CC WTR OUTLET VLV is throttled open (AB-388)	Verifies valve is throttled open to a mid position based on free movement of the handwheel in both the clockwise and counter-clockwise directions.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	Ensure XPP0014, SPENT FUEL PURIFICATION PUMP (AB-412) is stopped.	Candidate can verify stopped motor or can use control switch position to determine if XPP014 is stopped.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	SEQ		STEP STANDARD:
No	No	Ensure XVD06669-SF, SPENT FUEL POOL PUR HDR ISOL VALVE (FB-436) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT

STEP: 6

CUES:

CR	SEQ		STEP STANDARD:
No	No	Ensure XVD06674-SF, SPENT FUEL POOL PUR HDR SUPPLY VALVE (FB-436) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	No	Ensure XVG06666-SF, CASK LOADING AREA SF HEADER ISOL VALVE (FB-436) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	No	Ensure XVD06660-SF, SPENT FUEL POOL OUTLET HDR SUPPLY VALVE (AB-412) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	No	Ensure XVD06664-SF, REFUEL WTR STG TK SF HDR B SUCT ISOL (AB-412) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	No	Ensure XVD06667-SF, SF HDR B CASK LOADING AREA ISOL VALVE (AB-388) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	No	Ensure XVD06661-SF, SF COOLING PUMP B SF POOL HDR ISOL VLV (AB-388) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 12

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	No	Ensure XVD06692-SF, SF PUR HDR SF HEADER B SUP ISOL VALVE (AB-388) is closed.	Verifies that handwheel does not move in clockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Unlock and open XVG06668-SF, FUEL TRANSFER CANAL SF HDR ISOL VALVE (FB-436)	Removes locking device and takes handwheel in fully counterclockwise direction.

COMMENTS:

SAT _____

UNSAT _____

STEP: 14

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	No	Open XVG06665-SF, SPENT FUEL COOLING PUMP B SUCT ISOL VLV (AB-412)	Turns handwheel in the fully counterclockwise direction.

COMMENTS:

SAT _____

UNSAT _____

STEP: 15

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Open XVG06651-SF, SPENT FUEL COOLING PUMP B SUCTION VALVE (AB-412).	Turns handwheel in the fully counterclockwise direction.

COMMENTS:

SAT _____

UNSAT _____

STEP: 16

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Open XVG06655-SF, SPENT FUEL COOLING PUMP B DISCHARGE VLV (AB-412).	Turns handwheel in the fully counterclockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 17

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Open XVG06662-SF, REFUEL WTR STG TK SPENT FUEL ISOL VALVE (YD-170' W).	Turns handwheel in the fully counterclockwise direction.

COMMENTS:

SAT ______

UNSAT

STEP: 18

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Open XVG06663-SF, SPENT FUEL HEADER B DISCH ISOL VALVE (AB-388).	Turns handwheel in the fully counterclockwise direction.

COMMENTS:

SAT ______

UNSAT ______

STEP: 19

CUES:

If candidate wants to check pump oil level before start indicate that oil level is as seen.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Start XPP0032B-SF, SPENT FUEL PIT COOLING PUMP B (AB-412).	Takes switch to start verifies pump starts and that red light is lit. (May check oil level of pump prior to pump start)

COMMENTS:

SAT ______

UNSAT ______

STEP: 20

CUES:

CAUTION: To prevent damage to the Spent Fuel Cooling Pump, loop flow should NOT be throttled to LESS THAN 600 gpm.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Adjust XVT06659-SF, SPENT FUEL HEAT EXCHANGER B OUTLET VLV (AB-388), as necessary to maintain Refueling Cavity level greater than 460 ft 6 inches.	Contacts control room and throttles XVT06659-SF as directed.

COMMENTS:

SAT

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPP-408

DESCRIPTION: ALIGN SPENT FUEL COOLING LOOP B TO RETURN REFUELING CAVITY WATER TO THE RWST

IC SET:

INSTRUCTIONS:

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-081A**

OPERATIONAL LEAK RATE TEST (STP-114.002)
W/O IPCS LEAK RATE PROGRAM AVAILABLE

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 3

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

002-001-02-01 PERFORM REACTOR COOLANT SYSTEM WATER INVENTORY BALANCE

TASK STANDARD:

Unidentified leak rate determined to be 1.118 gpm (1.11 to 1.13 gpm) and outside Technical Specification limits.

TERMINATING CUE: Unidentified leakage calculated.

PREFERRED EVALUATION LOCATION ***PREFERRED EVALUATION METHOD***

CLASSROOM PERFORM

REFERENCES: STP-114.002 OPERATIONAL LEAK TEST

INDEX NO.	*K/A NO.*		*RO*	*SRO*
002000A401	A4.01	RCS leakage calculation program using the computer	3.5	3.8
002000K405	K4.05	Detection of RCS leakage	3.8	4.2
002000A301	A3.01	Reactor coolant leak detection system	3.7	3.9

TOOLS:
STP-114.002
CURVE BOOK Figure V-7
CURVE BOOK Figure VI-22
T.S. 3.4.6.2
CALCULATOR

EVALUATION TIME 20 ***TIME CRITICAL*** No ***10CFR55:*** 41(b)10

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ______________________ ______________________/__________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is operating at 100%. STP-114.002, primary leakrate surveillance is due. The IPCS Leak Rate Program is unavailable; however, the IPCS is available for data calculation.

INITIATING CUES: All data has been taken using the IPCS, lineups restored to normal, and you are to perform the manual leak rate calculation, using STP-114.002.

TIME START: 0345
TIME STOP: 0445

INITIAL DATA:

T0499A, RCL MEDIAN TAVG = 587.4°F
L0480A, PRESSURIZER LEVEL-LT459 = 60.2%
L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 57.1%
L0485A, PRESSURIZER RELIEF TANK L-LT470 = 75.0%
L1028, REACTOR COOL DR TNK LEV = 60.0%

FINAL DATA:

T0499A, RCL MEDIAN TAVG = 587.1°F
L0480A, PRESSURIZER LEVEL-LT459 = 59.4%
L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 53.5%
L0485A, PRESSURIZER RELIEF TANK L-LT470 = 75.0%
L1028, REACTOR COOL DR TNK LEV = 61.0%

Current Primary-to-Secondary Leakage = 0.0 gpm

Start with step 6.4.b. Another operator will complete 6.4.c

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is operating at 100%. STP-114.002, primary leakrate surveillance is due. The IPCS Leak Rate Program is unavailable; however, the IPCS is available for data calculation.

INITIATING CUES: All data has been taken using the IPCS, lineups restored to normal, and you are to perform the manual leak rate calculation, using STP-114.002.

TIME START: 0345
TIME STOP: 0445

INITIAL DATA:

T0499A, RCL MEDIAN TAVG = 587.4°F
L0480A, PRESSURIZER LEVEL-LT459 = 60.2%
L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 57.1%
L0485A, PRESSURIZER RELIEF TANK L-LT470 = 75.0%
L1028, REACTOR COOL DR TNK LEV = 60.0%

FINAL DATA:

T0499A, RCL MEDIAN TAVG = 587.1°F
L0480A, PRESSURIZER LEVEL-LT459 = 59.4%
L0112A, VOLUME CONTROL TANK LEVEL-LT-115 = 53.5%
L0485A, PRESSURIZER RELIEF TANK L-LT470 = 75.0%
L1028, REACTOR COOL DR TNK LEV = 61.0%

Current Primary-to-Secondary Leakage = 0.0 gpm

Start with step 6.4.b. Another operator will complete 6.4.c

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Inputs data into TEST DATA SHEET	Student inputs data, initial and final

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Calculates change in test data	Student subtracts initial data from final tc determine change in Tavg, Pressurizer level, VCT level, PRT level and RCDT level

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	*SEQ*		*STEP STANDARD:*
No	Yes	Inputs factor for leakage parameters	Student inputs data from References identified at the bottom of leakrate form.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Calculates TOTAL LEAKAGE	Student calculates Total leakage per STP-114.002 between 1.174 and 1.189 gpm. Tolerance given for reading Figure V-7: 1/2 the smallest increment, which is 5 DEGF. Since TAVG~587F, tolerance allowed for reading 585-590 DEGF, which yields a range of 81.5-84 gallons/1 DEGF change. This, in turn, yields the range of calculated TOTAL Leakage of 1.174 to 1.189 gpm.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Calculates IDENTIFIED LEAKAGE	Student calculates IDENTIFIED LEAKAGE per STP-114.002 between 0.06016 and 0.0615 gpm.. Tolerance given to allow using a range of 3.61 to 3.69 for interpolating the table in FIGURE VI-22. Considering the tolerance given for calculating TOTAL Leakage, this tolerance will have no bearing on the final calculated value for UNIDENTIFIED Leakage.

COMMENTS:

SAT ______

UNSAT

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Calculates UNIDENTIFIED LEAKAGE	Student calculates UNIDENTIFIED LEAKAGE per STP-114.002 between 1.11292 and 1.12925 gpm. Tolerance allowed as described in the Step for calculating TOTAL Leakage.

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

May prompt operator to report findings.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Student identifies Tech Spec LCO not satisfied.	Student reports to CRS that UNIDENTIFIED LEAKAGE is in excess of T.S. 3.4.6.2.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-081A

DESCRIPTION: OPERATIONAL LEAK RATE TEST (STP-114.002) W/O IPCS LEAK RATE PROGRAM AVAILABLE

IC SET:

INSTRUCTIONS:

COMMENTS:

KEY

TEST DATA SHEET

PART 1

	TIME	TAVG		PZR LEVEL		VCT LEVEL		PRT LEVEL		RCDT LEVEL	
		MCB TI-___	COMPUTER T0499A/ U0091	MCB LI-___	COMPUTER L0480A	MCB LI-___	COMPUTER L0112A	MCB LI-470	COMPUTER L0485A	XPN-0007 ILI01003	COMPUTER L1028
FINAL	0445	N/A	587.1	N/A	59.4	N/A	53.5	N/A	75.0	N/A	61.0
INITIAL	0345	↓	587.4	↓	60.2	↓	57.1	↓	75.0	↓	60.0
CHANGE	60 min.	* ↓	* 0.3	** ↓	** 0.8	↓	-3.6	↓	0.0	↓	1.0

CHG C

PART 2

2a: (-)24.3 - (-)25.2 gallons + 45.265 gallons + 50.4 gallons = 70.465 - 71.365 gallons ÷ 60 minutes
(6.4.d.3), Tavg) (6.4.e.3), PZR Level) (6.4.f.2), VCT Level) (Test Time)

= 1.174 - 1.189 gallons/minute TOTAL LEAKAGE

2b: (1) 0 gallons + (1) 3.61 - 3.69 gallons = 3.61-3.69 gallons ÷ 60 minutes
(6.4.g), PRT Level) (6.4.h), RCDT Level) (Test Time)

= 0.061 gallons/minute + (1) 0 gallons/minute = 0.06 - 0.0615 gallons/minute IDENTIFIED LEAKAGE
(6.4.i, Primary to Secondary leakage)

2c: 1.179 gallons/minute - 0.061 gallons/minute = 1.11 - 1.13 gallons/minute UNIDENTIFIED LEAKAGE
(2a, Total Leakage) (2b, Identified Leakage)

* Tavg decrease = negative gal./Tavg increase = positive gal. ** Pzr Level decrease = positive gal./Pzr Level increase = negative gal.

(1) Record value as zero for negative changes.

CHG C

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-006B**

CALCULATE REACTIVITY CONTROL
PARAMETERS (Base on new core at MOL)

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 1

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

004-006-01-01 PERFORM BORON CHANGE CALCULATIONS

TASK STANDARD:

OAP-100.6, Attachment IA, Reactivity Control Parameters, Page 1 completed. Tolerance will generally only be given for rounding; however, each case must be evaluated on an individual basis.

TERMINATING CUE: Examinee provides OAP-100.06, Attachment 1A to the Examiner.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
CLASSROOM	PERFORM

REFERENCES:		
	SAP-155	REACTIVITY MANAGEMENT
	OAP-100.06	CONTROL ROOM CONDUCT AND CONTROL OF ACTIVITIES

INDEX NO.	***K/A NO.***		***RO***	***SRO***
1940012118	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	3.6	3.8

TOOLS: OAP-100.6 ATTACHMENT IA
CALCULATOR
VC SUMMER CURVE BOOK
OAP-100.06, Attachment IA Answer Key (Examiner Copy)

EVALUATION TIME 15 ***TIME CRITICAL*** NO ***10CFR55:*** 45(a)12

TIME START: ______ TIME FINISH: ______ PERFORMANCE TIME ______

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ______________________ ______________________ / ______
SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is operating at 100%, steady-state power. It is Sunday day shift.

INITIATING CUES: The CRS directs the NROATC to complete OAP-100.06, Attachment IA, Reactivity Control Parameters, Page 1.

PARAMETER DATA:

RCS Boron Concentration = 1050 ppm
BURNUP = 10,000 MWD/MTU
BAT in Service = BAT "A"
BAT "A" Boron Concentration = 7000 ppm
BAT "B" Boron Concentration = 7581 ppm

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is operating at 100%, steady-state power. It is Sunday day shift.

INITIATING CUES: The CRS directs the NROATC to complete OAP-100.06, Attachment IA, Reactivity Control Parameters, Page 1.

PARAMETER DATA:

RCS Boron Concentration = 1050 ppm
BURNUP = 10,000 MWD/MTU
BAT in Service = BAT "A"
BAT "A" Boron Concentration = 7000 ppm
BAT "B" Boron Concentration = 7581 ppm

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

NOTE: Provide Examinee with blank copy of OAP-100.6, Attachment 1A, Reactivity Control Parameter Data Sheet and Station Curve Book. NOTE: Value obtained from Initiating Cues.

CR	SEQ		STEP STANDARD:
No	Yes	RCS Boron Concentration _______ ppm	Enters 1050 ppm.

COMMENTS:

SAT ______

UNSAT

STEP: 2

CUES:

NOTE: Value obtained from Initiating Cues.

CR	SEQ		STEP STANDARD:
No	Yes	Burnup _________ MWD/MTU	Enters 10000 MWD/MTU.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

NOTE: Value obtained from Initiating Cues.

CR	SEQ		STEP STANDARD:
No	Yes	(Check BAT in Service)	Checks BAT "A" inservice. Enters BAT "A" Boron Concentration = 7530 ppm. Enters BAT "B" Boron Concentration = 7581 ppm.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

NOTE: Value obtained from Table on Fig. II-3.7 for 10,000 MWD/MTU.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Moderator Temperature Coefficient (MTC) (Fig. II-7.2, HFP) ______ pcm/ppm	Enters -17.040 .

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

NOTE: Value obtained from Table on Fig. II-7.2 for 1050 ppm.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Differential Boron Worth (DBW) (Fig. II-7.2, HFP) _______ pcm/ppm	Enters - 6.83 to -6.96 pcm/ppm. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Gallons of Boric Acid or Reactor Makeup Water required to change RCS average temperature by one (1) degree: MTC/DBW = _____/______ = ________ ppm Boron Change/°F	Enters 2.4 to 2.5 for ppm Boron Change/°F. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	(Fig. III-2) ______ gal. Acid/°F	Enters 20.3 to 21.0 (for formula on Fig. III-2) gal. Acid/°F. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	(Fig. III-3) _________ gal. RMW/°F	Enters 113.0 to 122.2 gal. Reactor Makeup Water/°F. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

NOTE: Values from Fig. II-2: 1717 PD @ 100% RTP - 1549 PD @ 90% RTP = 168

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	Power Defect (PD) for 10% power change (100% to 90%) (Fig. II-2). _____ PD @ 100% RTP - _____ PD @ 90% = _____ Δ Power Defect, ppm	Enters 168 Δ Power Defect, ppm.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Gallons of Boric Acid only to reduce reactor power from 100% to 90%: Δ Power Defect/DBW = _____ / _____ = _______ ppm Boron	Enters 24.1 to 24.6 ppm Boron. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	(Figure III-2) _______ gal. Boric Acid/10% RTP	Enters 200 to 211 (using formula in Fig. III-2 or interpolation) gal. Boric Acid/10% RTP. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 12

CUES:

NOTE: Examinee determines value is taken from Step 9.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Final rod height using rods only to reduce reactor power from 100% to 90%: Δ Power Defect = Integrated Rod Worth (IRW) = _____ pccm	Enters 168 pcm.

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	(Fig. II-10) ___________ final rod height Bank D	Enters 185 to 170 final rod height Bank D. (see key for derivation)

COMMENTS:

SAT ______

UNSAT ______

STEP: 14

CUES:

CR	SEQ		STEP STANDARD:
Yes	No	For a 100% to 90% load reduction: Use ______ gallons boric acid (1/2 the gallons calculated above), and expect the rods to be at approximately ______ steps on bank "D (Fig. II.10 series, 1/2 the IRW, NOT 1/2 the steps).	Enters 100 to 106 and 200 to 198.

COMMENTS:

SAT ______

UNSAT ______

STEP: 15

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	Copies data from page 1 to page 2.	Right valves are grabbed from page 1 and placed on page 2.

COMMENTS:

SAT ______

UNSAT ______

STEP: 16

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	No	FCV 113 A&B, pot setting for current RCS boron concentration.	Enters 4.50.

COMMENTS:

SAT _____

UNSAT _____

STEP: 17

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Expected Boric Acid flowrate for VCT makeup _____	Enters 18.

COMMENTS:

SAT

UNSAT _____

STEP: 18

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Expected Boric Acid total gallons on an Auto Makeup based on current BAT in service: _______	Enters 40-41

COMMENTS:

SAT _____

UNSAT _____

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-006B

DESCRIPTION: CALCULATE REACTIVITY CONTROL PARAMETERS (Base on new core at MOL)

IC SET:

INSTRUCTIONS:

COMMENTS:

Key

REACTIVITY CONTROL PARAMETERS

NOTE

This information should be recalculated every Sunday Dayshift (when the plant is in Mode 1) to be available for Reactor Engineering review Monday morning or following work day.

RCS Boron Concentration (**C**RCS) 1050 ppm Burnup 10,000 MWD/MTU

(Check BAT in Service) 7600 7/26/11
☑ CB "A" BAT ~~7530~~ ppm
☐ CB "B" BAT 7581 ppm

Moderator Temperature Coefficient (**MTC**) (Fig. II-3.7, HFP) −17.040 pcm/°F

Differential Boron Worth (**DBW**) (Fig. II-7.2, HFP) −6.895 pcm/ppm [(−6.83 ↔ (−) 6.96]

Gallons of Boric Acid or Reactor Makeup Water required to change RCS average temperature by one (1) degree: (2.44828 − 2.49488)

MTC/DBW = −17.040 / −6.895 (−)6.96 − (−)6.83 = (ΔB) 2.471 ppm Boron Change/°F

gal. Acid/°F = 20.320724 − 20.956992 From Fig. III-2: gal. Acid/°F = 20.63285

gal. RMW/°F = 113.018064 − 122.169172 From Fig. III-3: gal. RMW/°F = 117.6196

Power Defect (PD) for 10% power change (100% to 90%) (Fig. II-2):

1717 PD @ 100% RTP - 1549 PD @ 90% RTP = 168 Δ Power Defect, pcm

Gallons of Boric Acid only to reduce reactor power from 100% to 90%:

Δ Power Defect/DBW = 168 / (−)6.83 − (−)6.96 = −24.365482 ppm Boron (−)24.137931 (−)24.59738

(Fig. III-2) (200 − 211) 204 gal. Boric Acid/10% RTP

Final rod height using rods only to reduce reactor power from 100% to 90%:
(Assume ARO)

Δ Power Defect = Integrated Rod Worth (IRW) = 168 pcm

(Fig. II-10) (185 − 170) final rod height Bank D
182

Key

REACTIVITY CONTROL PARAMETERS

> **NOTE**
>
> For a 10% reduction in load, ½ of the calculated boric acid should be used and ½ the calculated Control Rod motion.

For a 100% to 90% load reduction:

Use (100 - 100) 102 **gallons boric acid** (½ the gallons calculated above), and expect the rods to be at approximately 200 (200-198) **steps on bank D** (Fig. II-10 series, ½ the IRW, NOT ½ the steps).

To change T_{AVG} by 1°F: 21 **gallons Boric Acid/°F**

118 **gallons Reactor Makeup Water/°F**

For a 100% to 90% load reduction: **Use** 102 **gallons boric acid**

and expect 200 **steps on bank D**

> **NOTE:**
>
> **This calculation is to provide a second check to the batch integrator setting to establish continuity between the setting and actual make-up results.**

FCV 113 A&B, pot setting for current RCS boron concentration 4.50

Expected Boric Acid flowrate for VCT makeup 18

Expected Boric Acid total gallons on an Auto Makeup based on current BAT in service:

Current RCS CB 1050 / CB for BAT in service ~~7530~~ 7000 x (267-275) 271 gallons* = ~~38~~ ~~(37-39)~~ (40-41)

MPD 7/26/11 New.

* Normal Auto Makeup is 267 to 275 gallons

Calculation and Auto Makeup pot settings by ______________________
Signature / Date

Calculation and Auto Makeup pot settings verified by ______________________
Signature / Date

Reactor Engineering Review ______________________ Date __________

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-025**

TAGOUT "B" MDEFP

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 2

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

119-012-03-01 CONDUCT EQUIPMENT TAGOUTS (EQUIPMENT CLEARANCE AND SWITCHING)

TASK STANDARD:

'B' MDEFP is tagged out IAW SAP-201. The suction and discharge valves are tagged closed, pump casing drains and vents are tagged open, the motor is tagged out, and the correct sequence is identified for tagging.

One of the following two (2) valves should be tagged open to provide a vent path for draining (either one or both are acceptable).

1. XVT11006, MTR DR EF PUMP B SUCT HDR TEST ISOL VLV
2. XVT11007, MOTOR DRIVEN EF PUMP B VENT VALVE

TERMINATING CUE:

PREFERRED EVALUATION LOCATION CLASSROOM

PREFERRED EVALUATION METHOD PERFORM

REFERENCES: SAP-201 DANGER TAGGING

INDEX NO.	K/A NO.		RO	SRO
1940012213	2.2.13	Knowledge of tagging and clearance procedures.	4.1	4.3

TOOLS:
SAP-201 and OAP-100.5 (or computer access)
SAP-201, ATTACHMENT VIC (2 copies)
SAP-201, ATTACHMENT VIA (partially completed)
D-302-085, EMERGENCY FEEDWATER
ELECTRICAL FEEDER LIST FOR XSW1DB AND XMC1DB2X
SOP-211, ATTACHMENTS I - IV (or computer access)
Highlighters for each student (pink, blue, yellow, green).

EVALUATION TIME 45 **TIME CRITICAL** NO **10CFR55:** 45.13

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ______________________ ______________________ / ____________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is in MODE 1. Mechanical maintenance has requested a tagout to replace pump seals on 'B' MDEFW pump. This is emergent work, and no isolation points have been recommended at this time.

INITIATING CUES: The SS, Todd Price, directs you to prepare a tagout for the 'B' MDEFW pump. Complete SAP-201, Attachment VIC. Only tagged positions are required at this time. You do not have to fill out restoration positions, individual danger tags or Locked Valve Tracking sheets.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is in MODE 1. Mechanical maintenance has requested a tagout to replace pump seals on 'B' MDEFW pump. This is emergent work, and no isolation points have been recommended at this time.

INITIATING CUES: The SS, Todd Price, directs you to prepare a tagout for the 'B' MDEFW pump. Complete SAP-201, Attachment VIC. Only tagged positions are required at this time. You do not have to fill out restoration positions, individual danger tags or Locked Valve Tracking sheets.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Tag number is not critical, only the sequence is.

CR	SEQ		STEP STANDARD:
No	No	TAG - Enter the sequential tag number.	See completed Attachment VIC.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	SEQ		STEP STANDARD:
No	No	ISSUED TO - Check blocks for which discipline each component is tagged.	See completed Attachment VIC.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
No	No	HOLD TAG INST - Enter a check mark if a Hold Tag is to be placed on a control panel component.	See completed Attachment VIC.

COMMENTS:

SAT ______

UNSAT

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	No	COMPONENT I.D. - Enter the complete CHAMPS identification number of the component being tagged.	See completed Attachment VIC.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	PLANT LOC - Enter the specific plant location of the component being tagged.	See completed Attachment VIC.

COMMENTS:

SAT ______

UNSAT

STEP: 6

CUES:

Note: XVT11006-EF and XVT11007-EF required position is "UNCAPPED/OPEN".

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	REQ'D TAG POSIT - Enter the position in which the component is to be tagged.	See completed Attachment VIC.

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

CR	*SEQ*		*STEP STANDARD:*
Yes	Yes	INST SEQ - Enter sequence that tags are to be installed.	See completed Attachment VIC. Components must be sequenced as notated on attachment or in an equivalent sequence. Components of a smaller sequence number on the key must be listed before components of a larger sequence number.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-025

DESCRIPTION: TAGOUT "B" MDEFP

IC SET:

INSTRUCTIONS:

COMMENTS:

KEY

COMPONENT LOG

TAG		ISSUED TO (NOT CRITICAL) E	M	I&C	OTHER	HOLD TAG INST	COMPONENT ID	PLANT LOC	REQ'D TAG POSIT	INST SEQ	INST BY	VER BY	HOLD TAG REM	REM SEQ	TAG REM BY	REQ'D OPER POSIT	COMP REST REST BY	COMP REST VER BY
1	GROUP		X			X	XSW 1DB 03 EMERG FD WTR PUMP XPP0021B-EF	436'IB	BREAKER OPEN/ RACKED DOWN	1								
	CLEAR																	
2	GROUP		X			X	XMC1DB2X 03AD SER WTR TO EF PUMP B SUCTION XVG1001B-EF	436' IB	BREAKER OPEN/	1								
	CLEAR																	
3	GROUP		X				XVG01021B-EF MOTOR DRIVEN EF PUMP B DISCHARGE VALVE	423'IB	CLOSED	2								
	CLEAR																	
4	GROUP		X				XVT01028B-EF MTR DR EF PUMP B SAMPLE ISOLATION VALVE	412'IB	CLOSED	3								
	CLEAR																	
5	GROUP		X				XVT01025B-EF MTR DR EF PUMP B RECIRC HEADER ISOL VLV	412'IB	CLOSED	3								
	CLEAR																	
6	GROUP		X				XVG01011B-EF MTR DRIVEN EF PP B NORMAL SUCTION VLV	412'IB	CLOSED	4								
	CLEAR																	

KEY

COMPONENT LOG

TAG	ISSUED TO	E	M	I&C	OTHER	HOLD TAG INST	COMPONENT ID	PLANT LOC	REQ'D TAG POSIT	INST SEQ	INST BY	VER BY	HOLD TAG REM	REM SEQ	TAG REM BY	REQ'D OPER POSIT	COMP REST REST BY	COMP REST VER BY
7	GROUP						XVG01001B-EF	412' IB	CLOSED	4								
	CLEAR						SW LOOP B TO MD EFP B											
8	GROUP						XVT01031B-EF	412' IB	OPEN	5								
	CLEAR						MTR DR EF PUMP B RECIRC DRN VALVE											
9	GROUP						XVT11006-EF	412' IB	OPEN/	5	IT IS ONLY CRITICAL TO GET ONE OF THE VENT VALVES							
	CLEAR						MTR DR EF PUMP B SUCT HDR TEST ISOL VLV		UN CAPPED									
10	GROUP						XVT11007-EF	412' IB	OPEN/	5	IT IS ONLY CRITICAL TO GET ONE OF THE VENT VALVES							
	CLEAR						NOTOR DRIVEN EF PUMP B VENT VALVE		UN CAPPED									
	GROUP																	
	CLEAR																	
	GROUP																	
	CLEAR																	

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-083A**

APPLY FACILITY ALARA PRINCIPLES TO A
SPECIFIC TASK AND DETERMINE OVERALL DOSE

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 0

CANDIDATE: ______________________________

EXAMINER: ______________________________

THIS JPM IS APPROVED

DRAFT

TASK:

000-061-05-01 RESPOND TO AREA RADIATION MONITORING SYSTEM ALARMS

TASK STANDARD:

All critical tasks evaluated as SAT.

TERMINATING CUE: All options have been prioritized and provided to the Examiner.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
CLASSROOM	PERFORM

REFERENCES:

INDEX NO.	***K/A NO.***		***RO***	***SRO***
1940012312	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	3.7

TOOLS: HPP-0153, HPP-0155
Calculator

EVALUATION TIME 15 ***TIME CRITICAL*** NO ***10CFR55:*** 45.B.10

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: ______ UNSAT: ______

EXAMINER: ______________________ ______________________ / ______________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A hydrogen explosion in the waste gas system has resulted in a radioactive leak of a gas decay tank. The operating crew is performing the actions of ARP-019 XCP-644 Point 2-1, GAS DECAY TK AREA RM-G10 HI RAD. Several manual valves must be manipulated to isolate the leak. The general area radiation level where the work will be performed is 240 mR/hour. Airborne activity is estimated at 5 DAC-hours per minute of work.

There are four options for performing the work:
- One person without respirator = 25 minutes
- Two persons without respirator = 20 minutes
- One person with respirator = 35 minutes
- Two persons with respirator = 30 minutes

INITIATING CUES: You have been assigned to prioritize the four options according to the VC Summer ALARA philosophy. For the purposes of the JPM, assume that no dose is received in transit.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: A hydrogen explosion in the waste gas system has resulted in a radioactive leak of a gas decay tank. The operating crew is performing the actions of ARP-019 XCP-644 Point 2-1, GAS DECAY TK AREA RM-G10 HI RAD. Several manual valves must be manipulated to isolate the leak. The general area radiation level where the work will be performed is 240 mR/hour. Airborne activity is estimated at 5 DAC-hours per minute of work.

There are four options for performing the work:
- One person without respirator = 25 minutes
- Two persons without respirator = 20 minutes
- One person with respirator = 35 minutes
- Two persons with respirator = 30 minutes

INITIATING CUES: You have been assigned to prioritize the four options according to the VC Summer ALARA philosophy. For the purposes of the JPM, assume that no dose is received in transit.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Calculate dose for each option.	Reviews conditions. May refer to facility/corporate procedures for respirator factors and DAC conversion.

COMMENTS:

SAT ______

UNSAT

STEP: 2

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Calculate dose for each option. - One person w/o respirator.	(1)(240 mr/hr)(1 hr/60 minutes)(25 minutes) + (5 DAC-hrs/minute)(25 minutes)(2.5 mr/DAC-hr) = $\geq$ 412.5 mR.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Calculate dose for each option. - Two persons w/o respirator.	(2)(240 mr/hr)(1 hr/60 minutes)(20 minutes) + (2)(5 DAC-hrs/minute)(20 minutes)(2.5 mr/DAC-hr) = $\geq$ 660 mR.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Calculate dose for each option. - One person with respirator.	(1)(240 mr/hr)(1 hr/60 minutes)(35 minutes) = ≥ 140 mR.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Calculate dose for each option. - Two persons with respirator.	(2)(240 mr/hr)(1 hr/60 minutes)(30 minutes) = ≥ 240 mR.

COMMENTS:

SAT

UNSAT ______

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Prioritize options IAW the lowest total dose.	1. One person with respirator. 2. Two persons with respirator 3. One person w/o respirator. 4. Two persons without respirator.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-083A

DESCRIPTION: APPLY FACILITY ALARA PRINCIPLES TO A SPECIFIC TASK AND DETERMINE OVERALL DOSE

IC SET: N/A

INSTRUCTIONS:

COMMENTS:

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-009**

DETERMINE SHIFT MANNING REQUIREMENTS

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 1

CANDIDATE: ______________________________

EXAMINER: ______________________________

SRO ONLY

THIS JPM IS APPROVED

DRAFT

TASK:

341-050-01-03 SS RELIEF CHECKLIST REVIEW (SAP-200)

TASK STANDARD:

Determines that, to meet TS, need a qualified ABUL to either stay over or come in early. (O'Kimosh or Gillens must stay over to be the ABUL). Determines that, to meet normal shift complement, an ABUL, ABLL, and CBAO are needed. (O'Kimosh and Gillens must stay over and one operator on days off must be called in to cover ABUL, ABLL, and CBAO).

TERMINATING CUE: Complete review of the manning sheet.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
CLASSROOM	PERFORM

REFERENCES:	OAP-100.2	OPERATIONS PERSONNEL EXPECTATIONS ANI RESPONSIBILITIES
	SAP-153	INDEPENDENT VERIFICATION
	SAP-200	CONDUCT OF OPERATIONS

INDEX NO.	***K/A NO.***		***RO***	***SRO***
1940012103	2.1.3	Knowledge of shift or short-term relief turnover practices.	3.7	3.9

TOOLS: OAP-100.2, Operating Personnel Expectations and Responsibilities
SAP-153, Component/Condition Verification
SAP-200, Conduct of Operations

EVALUATION TIME 10 ***TIME CRITICAL*** NO ***10CFR55:*** 41b10

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ____________

PERFORMANCE RATING: SAT: _____ UNSAT: _____

EXAMINER: ______________________ ______________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: None

INITIAL CONDITION: Plant is in MODE 1 at 100% power. Shift turnover is being conducted and the SE requests assistance determining what to do because staffing is inadequate.

Due to a recent influenza epidemic, Doug Foreman, Doug Strother, and Rodney Cromer have been admitted to the hospital and will not be able to work the upcoming shift.

No extra personnel, such as Rovers, are available on either shift.

The entire Admin shift is on a benchmarking trip at Diablo Canyon.

INITIATING CUES: As the oncoming Shift Supervisor, review the shift manning for the next four hours. Determine what actions, if any, must be taken to: 1) meet the minimum technical specifications manning requirements; 2) meet the normal full crew complement.

No extensions/deviations are to be granted. Operations Management has decided that, although this is an unusual situation, they want to maintain a normal shift complement. Operations management is coming in within 4 hours to assist with a long term manning plans.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: None

INITIAL CONDITION: Plant is in MODE 1 at 100% power. Shift turnover is being conducted and the SE requests assistance determining what to do because staffing is inadequate.

Due to a recent influenza epidemic, Doug Foreman, Doug Strother, and Rodney Cromer have been admitted to the hospital and will not be able to work the upcoming shift.

No extra personnel, such as Rovers, are available on either shift.

The entire Admin shift is on a benchmarking trip at Diablo Canyon.

INITIATING CUES: As the oncoming Shift Supervisor, review the shift manning for the next four hours. Determine what actions, if any, must be taken to: 1) meet the minimum technical specifications manning requirements; 2) meet the normal full crew complement.

No extensions/deviations are to be granted. Operations Management has decided that, although this is an unusual situation, they want to maintain a normal shift complement. Operations management is coming in within 4 hours to assist with a long term manning plans.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

Dennis Smith, Aubrey Horne, or Andy Kushlak, can't stay over because they will exceed 16 in a 24 as soon as they do stay. Ron Snipes and Matt Crawford cannot help because they are not qualified ABUL.

CR	***SEQ***		***STEP STANDARD:***
Yes	No	Review the shift manning to determine actions for Tech Specs minimum manning.	Determine that an ABUL watch is needed and that O'Kimosh or Gillens must stay over to be ABUL.

COMMENTS:

SAT ______

UNSAT ______

STEP: 2

CUES:

O'Kimosh, Gillen, Burke, and Willis are the only off going qualified operators that will remain within 16 hours in a 24 hour period if they stay over.

If asked to call in another building operator ask what their qualifications must be (must be qualified AB) and then respond that no operators are available for call in within the next 3 hours.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Review the shift manning to determine actions for normal full complement.	Determine that an ABUL, ABLL, and CBAO is needed. For the first 4 hrs, 3 of the following must stay over O'Kimosh, Gillen, Burke, and Willis must stay over as either ABUL, ABLL, or CBAO. May wish to call in an operator to not hold over Burke or Willis.

COMMENTS:

SAT ______

UNSAT

STEP: 3

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	No	Reviews OAP-100.2 for callout requirements.	Determines that the first priority is Admin shift for Day shift. Since the Admin shift is on a benchmarking trip, an operator on his day off must be called in.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-009

DESCRIPTION: DETERMINE SHIFT MANNING REQUIREMENTS

IC SET:

INSTRUCTIONS:

COMMENTS:

KEY

DISCUSSION OF MINIMUM CREW COMPLEMENTS:

If an operator stays over to work 4 hours OT, for each hour of OT, the 24 and 48 hour clocks slide 1 hour. Assuming the operator had 12 hours off prior to the shift, each hour of OT remains at "24 in a 48". However, at the end of 4 hours OT, the "16 in a 24" limit is reached.

SAP-152, Step 6.1.1: The following limits apply to covered individuals regardless of unit status:

A. No more than 16 work hours in any 24-hour period
B. No more than 26 work hours in any 48-hour period
C. No more than 72 work hours in any 7-day period
D. At least a 10-hour break between successive work periods, or an 8-hour break when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts.
E. A 34-hour break in any 9-calendar day period.

Minimum crew complements are defined in Section 6.2.2 of Tech Specs (Table 6.2-1 shows T.S. minimum). Enclosure A of SAP-200 delineates same information, but also includes FEP manning, Fire Brigade manning, EPP manning and Normal Shift complement.

	OFF-GOING					ON-COMING				
Position	Name	Last 24	Last 48	Last 7 days	Current Quals	Name	Last 24	Last 48	Last 7 days	Current Quals
SS	J. Burke	12	24	36	All SRO, RO,AO	A. Harris	12	24	36	All SRO, RO,AO
CRS	S. Willis	12	24	36	CRS, All RO,AO	M. Eckhart	12	24	36	CRS, All RO,AO
RO	A.Kushlak	16	16	28	All SRO, RO,AO	B. Steed	12	24	36	All SRO, RO,AO
BOP	N. O'Kimosh	12	24	36	All RO, AO	J. McGee	12	16	28	All RO, AO
Control Building	A. Horne	16	24	40	All AO	D. Strother	12	24	36	All AO
Turbine Building	M. Crawford	12	24	36	TB, IB	R. Kline	12	24	36	TB, IB
Intermediate	R. Snipes	12	24	36	TB, IB	K. Keener	12	24	36	TB, IB
ABUL	E. Gillens	12	24	36	All AO	R. Cromer	12	24	36	All AO
ABLL	D. Smith	16	16	28	All AO	D. Foreman	12	24	36	All AO
SE	P. Pittman	12	24	36	SE	E. Rumsfelt	12	24	36	SE

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-025A**

REVIEW TAGOUT FOR "B" MDEFP

APPROVAL: RJ *APPROVAL DATE:* 7/30/2011

REV NO: 2

CANDIDATE: ______________________

EXAMINER: ______________________

THIS JPM IS APPROVED

DRAFT

TASK:

342-005-03-02 AUTHORIZE HANGING OF TAGS ON PLANT EQUIPMENT

TASK STANDARD:

'B' MDEFP is tagged out IAW SAP-201. The suction and discharge valves are tagged closed, pump casing drains and vents are tagged open, the motor is tagged out, and the correct sequence is identified for tagging.

TERMINATING CUE:

PREFERRED EVALUATION LOCATION — SIMULATOR

PREFERRED EVALUATION METHOD — PERFORM

REFERENCES: SAP-201 DANGER TAGGING

INDEX NO.	*K/A NO.*		*RO*	*SRO*
1940012213	2.2.13	Knowledge of tagging and clearance procedures.	4.1	4.3

TOOLS:

SAP-201, OAP-100.5, OAP-102.1 (or computer access)
SAP-201, ATTACHMENT VIC (Completed with errors)
OAP-102.1 ATTACHMENT I EQUIPMENT LINEUP REQUEST (Completed)
OAP-102.1, ATTACHMENT VI SCHEDULING TAGOUT PACKAGE CHECKLIST (with signature stamp, first SRO review initialed)
D-302-085, EMERGENCY FEEDWATER (NUCLEAR), (Boundaries indicated with error)
ELECTRICAL FEEDER LIST FOR 1DB AND 1DB2X
SOP-211, ATTACHMENTS I - IV

EVALUATION TIME 30 ***TIME CRITICAL*** NO ***10CFR55:*** 45.13

TIME START: ________ TIME FINISH: ________ PERFORMANCE TIME: ________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ____________________ ____________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is in Mode 1. B1 Maintenance Work Week. Emergent work for pump seal replacement on 'B' Motor-Driven EFW Pump is to be performed. A work package has been completed. LOTO is unavailable.

INITIATING CUES: As an SRO, you are to review the work package prior to allowing the tagout to be hung and the work to begin. Positions for restoration are not required at this time. Limit your review to the Tagout Preparation Section of OAP-102.1, Attachment VI, SCHEDULING TAGOUT PACKAGE CHECKLIST.

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS:

INITIAL CONDITION: The plant is in Mode 1. B1 Maintenance Work Week. Emergent work for pump seal replacement on 'B' Motor-Driven EFW Pump is to be performed. A work package has been completed. LOTO is unavailable.

INITIATING CUES: As an SRO, you are to review the work package prior to allowing the tagout to be hung and the work to begin. Positions for restoration are not required at this time. Limit your review to the Tagout Preparation Section of OAP-102.1, Attachment VI, SCHEDULING TAGOUT PACKAGE CHECKLIST.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

If required during this JPM, remind examinee to limit review to the preparation section of OAP-102.1, Attachment VI.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Checks correct train work week.	Notes that B1 train work week is indicated.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Scope of all work requiring tags within the tagout boundary.	Must note the following errors in the specified isolation during this review: - XVT01028B missing from boundary - XVT11006 vent valve position specified as CLOSED incorrectly - XVG1001A incorrectly specified, should be XVG1001B

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	All power sources are tagged as required per job scope	Must note the following error: - XMC1DB2X 03 AD (isolation of power to XVG1001B MOV) is missing.

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Install sequence logical	Notes that install sequence meets requirements.

COMMENTS:

SAT ______

UNSAT ______

STEP: 5

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Are hold tags needed and identified for switches, MCB gages, or status lights?	Notes pump breaker indicates HOLD tag required.

COMMENTS:

SAT

UNSAT ______

STEP: 6

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Restoration position in a Clear Tag Enclosure has been verified per SOP.	Not required

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

If required, remind examinee that this is not required for this review.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Component worked has a "NO TAG" assigned to it and sequence in the Clear Tag Enclosure.	Not required

COMMENTS:

SAT ______

UNSAT

STEP: 8

CUES:

Remind student that since the package has to be done manually the conflict check provided by the computer system is not available.

CR	***SEQ***		***STEP STANDARD:***
No	No	Conflict check performed and warning flags are evaluated and understood?	N/A

COMMENTS:

SAT ______

UNSAT ______

STEP: 9

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Electrical Feeder list review and included, if necessary.	Determines that electrical feeder list is included in package.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	System/ Electrical drawing utilized are marked up with tagout boundaries and tagout index#	Notes that drawing is correctly marked.

COMMENTS:

SAT ______

UNSAT

STEP: 11

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Vent and Drain information Sheet included if necessary?	Notes Vent and Drain Information sheet included.

COMMENTS:

SAT ______

UNSAT ______

STEP: 12

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	All errors found	Must note the following errors in the specified isolation during this review: - XMC1DB2X 03 AD (isolation of power to XVG1001B MOV) is missing. - XVT01028B missing - XVT11006 vent valve position CLOSED incorrectly - XVG1001A incorrectly specified, should be XVG1001B

COMMENTS:

SAT ______

UNSAT ______

STEP: 13

CUES:

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Work Document numbers on WPO?	Determines that WPO is not required with only one work request for the tagout

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-025A

DESCRIPTION: REVIEW TAGOUT FOR "B" MDEFP

IC SET:

INSTRUCTIONS:

COMMENTS:

SRO REVIEW

1. MRB

2. ______

SCHEDULING TAGOUT PACKAGE CHECKLIST

SYSTEM/COMPONENT B MD EFW PUMP

Date Scheduled: TODAY　　　Tagout #: 11-0444

YES	N/A	TAGOUT PREPARATION
✓		Correct train work week: Work Week (circle) A1 A2 B1 B2
✓		Scope of all work requiring tags within tagout boundary?
✓		All power sources are tagged as required per job scope?
✓		Install sequence logical? (Sequence based on sequence critical or plant location)
✓		Are hold tags needed and identified for switches, MCB gages, or status lights?
	✓	Component worked has a "NO TAG" assigned to it and sequenced in the Clear Tag Enclosure?
	✓	Restoration position in Clear Tag Enclosure has been verified per SOP? NOT REQUIRED MRB
	✓	Conflict check performed and warning flags are evaluated and understood?
✓		Electrical feeder list reviewed and included, if necessary?
✓		System / Electrical drawings utilized are marked up with tagout boundaries and tagout index #. If the latest drawing revision or CHAMPS equipment ID is not available, generate a CR and get Ops Management approval prior to proceeding.
✓		Vent and drain information sheet included, if necessary?
	✓	Work document numbers on WPO?
		Tagout and Work Order Step Impact review
		EOOS Assessment: **Low** ☐ **Moderate** ☐ **Elevated** ☐ **High** ☐
		If redundant equipment removal results in CDF > 1.25, placard per OAP-114.1
		Reviewed for Reactivity Management ?
		Reviewed for Maintenance Rule?
		Reviewed for FME?
		Reviewed for Hazardous Energy Extra Protection Requirements per SAP-201?
		Reviewed for the potential to create an unmonitored release?
		WPO Index Number on work documents?
		Tagout reviewed for impacts, Tagout Impacts Tab Section updated?
		Instruments affected by tagout evaluated for impact on system?
		Retest reviewed and assigned to the Work Order step?
		Assembled Package Review
		Activity Impact Evaluation sheet completed and enclosed per OAP-102.1, Att VIII?
		R&R created, if necessary?
		GTP-702 reviewed?
		Tagout package involves risk (include management approval)? (Att. II, Ops signoff)
		This work reviewed for impact on the integrity of the Control Room Pressure Boundary. If the Control Room boundary is impacted: • Are compensatory measures provided by Engineering Services? or • Already provided by the applicable procedure?
		Designated for review by Shift Test Specialist or Fire Protection Supervisor for any Fire Protection related activities/equipment?
		SOP, EMP, MMP, or other procedure used to coordinate work?
		Tagout requires coordination between groups (including contact)?

☐ Remarks (if checked see attached)

COMPONENT LOG

TAG	ISSUED TO					HOLD TAG INST	COMPONENT ID	PLANT LOC	REQ'D TAG POSIT	INST SEQ	INST BY	VER BY	HOLD TAG REM	REM SEQ	TAG REM BY	REQ'D OPER POSIT	COMP REST	
		E	M	I&C	OTHER												REST BY	VER BY
1	GROUP		X			X	XSW 1DB 03 EMERG FD WTR PUMP XPP0021B-EF	436'IB	BREAKER OPEN/ RACKED DOWN	1								
	CLEAR																	
2	GROUP		X				XVG01021B-EF MOTOR DRIVEN EF PUMP B DISCHARGE VALVE	423'IB	CLOSED	2								
	CLEAR																	
3	GROUP		X				XVT01025B-EF MTR DR EF PUMP B RECIRC HEADER ISOL VLV	412'IB	CLOSED	3								
	CLEAR																	
4	GROUP		X				XVG01011B-EF MTR DRIVEN EF PP B NORMAL SUCTION VLV	412'IB	CLOSED	4								
	CLEAR																	
5	GROUP		X				XVG01001A-EF SW LOOP B TO MD EFP B	412'IB	CLOSED	4								
	CLEAR																	
6	GROUP						XVT01031B-EF MTR DR EF PUMP B RECIRC DRN VALVE	412' IB	OPEN	5								
	CLEAR																	

COMPONENT LOG

TAG	ISSUED TO					HOLD TAG INST	COMPONENT ID	PLANT LOC	REQ'D TAG POSIT	INST SEQ	INST BY	VER BY	HOLD TAG REM	REM SEQ	TAG REM BY	REQ'D OPER POSIT	COMP REST	
		E	M	I&C	OTHER												REST BY	VER BY
7	GROUP CLEAR						XVT11006-EF MTR DR EF PUMP B SUCT HDR TEST ISOL VLV	412' IB	CLOSED UN CAPPED	5								
8	GROUP CLEAR						XVT11007-EF MOTOR DRIVEN EF PUMP B VENT VALVE	412' IB	OPEN UN CAPPED	5								

EQUIPMENT LINEUP REQUEST

Due to work scheduled for Today, the following system/equipment lineups are needed.

System(s) Affected: 'B' MOTOR DRIVEN EFW PUMP

Reason/ Requirements: B Motor-Driven EFW Pump seal replacement will require draining of system to IB sump via rubber hose.

Contact Person(s) If Problem is Incurred:

Needed By: Mechanical Maintenance (JC Frick)

Matthew R. Bender / Today
Signature Date

V.C. SUMMER NUCLEAR STATION
JOB PERFORMANCE MEASURE

JPM NO: **JPA-020**

CLASSIFY EMERGENCY PLAN EVENT

APPROVAL: RJ ***APPROVAL DATE:*** 7/30/2011

REV NO: 5

CANDIDATE: ______________________________

EXAMINER: ______________________________

SRO ONLY

THIS JPM IS APPROVED

TIME CRITICAL JPM

TASK:

344-019-03-02 CLASSIFY EMERGENCY EVENTS REQUIRING EMERGENCY PLAN IMPLEMENTATION

TASK STANDARD:

Event properly classified as a SITE AREA EMERGENCY due to FS 1.1 Loss or potential loss of any two barriers (Table F-1). This is a time critical JPM and the declaration must be made within 15 minutes after the emergency condition exists and the ENF form must be completed within 15 minutes of the declaration.

TERMINATING CUE: Classification has been made and ENF form has been completed.

PREFERRED EVALUATION LOCATION	***PREFERRED EVALUATION METHOD***
CLASSROOM	PERFORM

REFERENCES: EPP-001 ACTIVATION AND IMPLEMENTATION OF THE EM

INDEX NO.	***K/A NO.***		***RO***	***SRO***
1940012106	2.1.6	Ability to manage the control room crew during plant transients.	3.8	4.8

TOOLS: EPP-001- Attachment I.
EPP-002- Attachment I.

EVALUATION TIME 30 ***TIME CRITICAL*** YES ***10CFR55:*** 45(a)11

TIME START: ____________ TIME FINISH: ____________ PERFORMANCE TIME: ________

PERFORMANCE RATING: SAT: ____ UNSAT: ____

EXAMINER: ______________________ ______________________ / ________

SIGNATURE DATE

INSTRUCTIONS TO OPERATOR

READ TO OPERATOR:

WHEN I TELL YOU TO BEGIN, YOU ARE TO PERFORM THE ACTIONS AS DIRECTED IN THE INITIATING CUES. I WILL DESCRIBE THE GENERAL CONDITIONS UNDER WHICH THIS TASK IS TO BE PERFORMED AND PROVIDE THE NECESSARY TOOLS WITH WHICH TO PERFORM THIS TASK. BEFORE STARTING, I WILL EXPLAIN THE INITIAL CONDITIONS, WHICH STEPS TO SIMULATE OR DISCUSS, AND PROVIDE INITIATING CUES. WHEN YOU COMPLETE THE TASK SUCCESSFULLY, THE OBJECTIVE FOR THIS JOB PERFORMANCE MEASURE WILL BE SATISFIED.

SAFETY CONSIDERATIONS: Ensure that you check DRILL on EPP-002, Attachment I (Nuclear power plant emergency notification form).

INITIAL CONDITION: The plant was initially at 100% power, when a plant S/D was commenced per AOP-112.2 for a significant S/G Tube Leak. The reactor trip breakers were opened 30 minutes ago.

The 'A' steam generator has been isolated in accordance with AOP-112.2 and the crew is performing step 22 to determine the target temperature for cooldown.

Chemistry was directed to sample the RCS and S/Gs for activity. Results are as follows:

RCS - 417 µCi/gm DE I-131
S/G 'A': Tube leak indicated.
S/G 'B': No indication of tube leak.
S/G 'C': No indication of tube leak.

Current steam generator pressures:
S/G 'A': 990 psig and lowering.
S/G 'B': 1090 psig and stable.
S/G 'C': 1090 psig and stable.

RB pressure is 0.5 psig and stable.

RCS conditions are stable and net charging indicates 30 gpm.

Meteorological data is not available.

INITIATING CUES: Classify plant event per EPP-001 and complete the ENF form.

THIS IS A TIME CRITICAL JPM!

HAND JPM BRIEFING SHEET TO OPERATOR AT THIS TIME!

JPM BRIEFING SHEET

OPERATOR INSTRUCTIONS:

SAFETY CONSIDERATIONS: Ensure that you check DRILL on EPP-002, Attachment I (Nuclear power plant emergency notification form).

INITIAL CONDITION: The plant was initially at 100% power, when a plant S/D was commenced per AOP-112.2 for a significant S/G Tube Leak. The reactor trip breakers were opened 30 minutes ago.

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S/G 'A': 990 psig and lowering.
S/G 'B': 1090 psig and stable.
S/G 'C': 1090 psig and stable.

RB pressure is 0.5 psig and stable.

RCS conditions are stable and net charging indicates 30 gpm.

Meteorological data is not available.

INITIATING CUES: Classify plant event per EPP-001 and complete the ENF form.

HAND THIS PAPER BACK TO YOUR EVALUATOR WHEN YOU FEEL THAT YOU HAVE SATISFACTORILY COMPLETED THE ASSIGNED TASK.

STEPS

STEP: 1

CUES:

If student does not explain basis for the classification, the evaluator must ask him to describe the basis. If the basis is not justified, this constitutes failure, even if the classification is correct.

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Evaluate plant conditions and classify event per EPP-001.	Classifies event, per EPP-001 as a SITE AREA EMERGENCY due to FS 1.1: Loss or potential loss of any two barriers (Table F-1) Detection Method: E.4- Loss of Fuel Clad Barrier based on Dose equivalent I-131 coolant activity >300 microCi/gm. No loss of Reactor Coolant System Barrier since using AOP-112.2 to combat accident (still on normal charging and SI not required. D.4 Loss of Containment Barrier based on Primary-to-secondary leakrate>10 gpm AND Unisolable steam release from affected SG to the environment.

COMMENTS:

SAT

UNSAT ______

STEP: 2

CUES:

When candidate indicates where ENF forms are stored provide a blank ENF form.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Obtains EPP-002 Attachment I (ENF)	Determines that EPP-002 Attachment I (ENF) is stored in the Shift Supervisors office.

COMMENTS:

SAT ______

UNSAT ______

STEP: 3

CUES:

CR	SEQ		STEP STANDARD:
No	Yes	Completes line 1 of ENF.	Checks "Drill" and writes message number as "1".

COMMENTS:

SAT ______

UNSAT ______

STEP: 4

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	Completes line 2 of ENF.	Checks "Initial".

COMMENTS:

SAT ______

UNSAT

STEP: 5

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	Completes line 4 of ENF.	Checks "Site Area Emergency" writes in "FS 1.1" and "Loss or potential loss of any two barriers" or the equivalent.

COMMENTS:

SAT ______

UNSAT ______

STEP: 6

CUES:

CR	SEQ		STEP STANDARD:
Yes	Yes	Completes line 5 of ENF.	Checks "Is Occurring"

COMMENTS:

SAT ______

UNSAT ______

STEP: 7

CUES:

This step is not critical.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Completes line 7.	Checks "Above normal operating limits"

COMMENTS:

SAT ______

UNSAT ______

STEP: 8

CUES:

This step is not critical.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Completes line 8.	Checks "Stable"

COMMENTS:

SAT ______

UNSAT

STEP: 9

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Completes line 10	Checks "Declaration" and includes declaration time.

COMMENTS:

SAT ______

UNSAT ______

STEP: 10

CUES:

CR	***SEQ***		***STEP STANDARD:***
Yes	Yes	Completes line 12.	Writes % Power as 0 and indicates time of trip (30 minutes prior to start of JPM).

COMMENTS:

SAT ______

UNSAT ______

STEP: 11

CUES:

This step is not critical.

CR	***SEQ***		***STEP STANDARD:***
No	Yes	Completes line 13.	Writes summary of occurrence at the plant. To include failed fuel, a steam generator tube leak, and an uncontrolled release of steam from the steam generator with a tube leak.

COMMENTS:

SAT ______

UNSAT ______

Examiner ends JPM at this point.

JPM SETUP SHEET

JPM NO: JPA-020

DESCRIPTION: CLASSIFY EMERGENCY PLAN EVENT

IC SET:

INSTRUCTIONS:

COMMENTS:

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

1. ☒ DRILL B ACTUAL EVENT MESSAGE # 1
2. ☒ INITIAL B FOLLOW-UP NOTIFICATION: TIME ____ DATE __/__/__ AUTHENTICATION # ____
3. SITE: V. C. Summer Confirmation Phone # (___) ____

4. EMERGENCY CLASSIFICATION: A UNUSUAL EVENT B ALERT ☒ SITE AREA EMERGENCY D GENERAL EMERGENCY
BASED ON EAL # FS 1.1 EAL DESCRIPTION: Loss or potential loss of any two barriers

5. PROTECTIVE ACTION RECOMMENDATIONS: ☒ NONE
B EVACUATE ____
C SHELTER ____
D CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.
E OTHER ____

6. EMERGENCY RELEASE: A None ☒ Is Occurring C Has Occurred
7. RELEASE SIGNIFICANCE: A Not applicable B Within normal operating limits ☒ Above normal operating limits D Under evaluation
8. EVENT PROGNOSIS: A Improving ☒ Stable C Degrading
9. METEOROLOGICAL DATA: Wind Direction* from ____ degrees Wind Speed* ____ mph
(*May not be available for Initial Notifications) Precipitation* ____ Stability Class* A B C D E F G
10. ☒ DECLARATION B TERMINATION Time Time of declaration Date __/__/__
11. AFFECTED UNIT(S): ☒ 2 3 All start of JPM-30 minutes
12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)
☒ U1 0 % Power Shutdown at Time ____ Date __/__/__
B U2 ____ % Power Shutdown at Time ____ Date __/__/__
C U3 ____ % Power Shutdown at Time ____ Date __/__/__
13. REMARKS: ____

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)
EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: A Elevated B Mixed C Ground UNITS: A Ci B Ci/sec C µCi/sec
MAGNITUDE: Noble Gases: ____ Iodines: ____ Particulates: ____ Other: ____
FORM: A Airborne Start Time ____ Date __/__/__ Stop Time ____ Date __/__/__
B Liquid Start Time ____ Date __/__/__ Stop Time ____ Date __/__/__
15. PROJECTION PARAMETERS: Projection period: ____ Hours Estimated Release Duration ____ Hours
Projection performed: Time ____ Date __/__/__
16. PROJECTED DOSE:

DISTANCE	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: ____ Title ____ Time ____ Date __/__/__
NOTIFIED BY: ____ RECEIVED BY: ____ Time ____ Date __/__/__

= critical.

Key