

**Draft Submittal**

**MCGUIRE FEB 2005 EXAM  
50-369 & 370/2005-301**

**FEBRUARY 7 - 15, 2005  
FEBRUARY 18, 2005 (written)**

1. **Operating Test Simulator Scenarios**

Facility: McGuire

Scenario No.: 1

Op-Test No.: \_\_\_\_\_

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

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

Initial Conditions: 100% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged

Turnover: Perform turbine Bearing Oil Pump Performance Test

Event No.	Malf. No.	Event Type*	Event Description
1		N	(RO) Main turbine Bearing Oil Pump Test
2		I	(BOP) 1NV-124 Fails Open
3		I	(RO) Channel 1 Steam Pressure Fails low
4		C	(RO) Control Rod Insertion
5		C	(BOP) Operating RN pump trips
6		I/C	(BOP) PZR Pressure Channel 2 fails HIGH
7		C	(CREW) Steam Leak requiring shutdown
8		M	Steam Break Outside Containment
			MSIVs fail to close on automatic signal – RO closes manually
			No Auto SI
			Phase "A" Train "A" fails to automatically actuate
			"A" Reactor Trip breaker will not open from control room
			"B" S/G MSIV will not close

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 22

TOPIC: Nuclear Regulatory Commission Simulator Exam

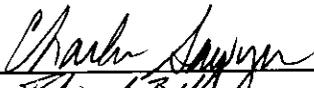
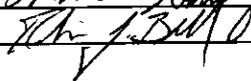
Scenario 1

**REFERENCES:**

1. McGuire Technical Specifications
2. PT/1/A/4450/003 A Annulus Ventilation System Train A Operability Test
3. AP/1/A/5500/03 Load Rejection
4. AP/1/A/5500/04 Rapid Downpower
5. AP/1/A/5500/06 Loss of S/G Feedwater
6. AP/1/A/5500/11 Pressurizer Pressure Anomalies
7. AP/1/A/5500/14 Rod Control Malfunction
8. AP/1/A/5500/20 Loss of RN
9. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
10. EP/1/A/5000/E-2 Faulted Steam Generator Isolation
11. EP/1/A/5000/ES 1.1 Safety Injection Termination
12. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:

  
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Nov. 19, 2004  
Rev. 1

## EVENT SUMMARY

1. Annulus Ventilation Syst. Train A Operability Test.
2. 1NV-124 failure.
3. S/G C Channel 1 Steam Pressure fails Low. Enter AP-6
4. Unwarranted Control Rod Movement Enter AP-14
5. Operating RN pump trips
6. PZR. Pressure Channel 2 fails HIGH. Enter AP-11
7. Steam Break Outside Containment. Enter AP-01
8. PZR Level going down requires Rx. Trip and SI. Enter E-0 then E-2 then ES 1.1

### SIMULATOR OPERATOR INSTRUCTIONS

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC - 121	
<input type="checkbox"/>		RUN	
<input type="checkbox"/>		<b>Update</b> Status Board,  <b>Setup</b> OAC  <b>Setup</b> ICCM, Turbine Displays, & Trend Recorders.  <b>Check</b> Rod Step Counters agree with rod positions	See Shift Turnover Information
<input type="checkbox"/>		<b>(M) EPQ001A</b>  <b>Set = 1</b>	Loss of D/G "1A" Control Power
<input type="checkbox"/>		<b>(LOA) CA009</b>  <b>Set = F</b>	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		<b>(M) SM006B</b>	Failure of S/G B MSIV to close – Auto or manual
<input type="checkbox"/>		<b>(M) ISE 003A</b>	Failure of Automatic Phase A Train A
<input type="checkbox"/>		<b>(M) ISE002A</b> <b>(M) ISE002B</b>	Failure of automatic Safety Injection – both trains
<input type="checkbox"/>		<b>(M) ISE 006A</b> <b>(M) ISE 006B</b>	Failure of Automatic Main Steam Isolation –both trains
		<b>(M) IPE001A</b> <b>(M) IPE002A</b>	Failure of the "A" reactor trip breaker to open from the control room.

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>		Freeze.	
<input type="checkbox"/>		Update Fresh Tech. Spec. Log.	
<input type="checkbox"/>		Fill out the NLO's Available section of Shift Turnover Info.	
<input type="checkbox"/>	Prior to Crew Briefing	RUN	
<input type="checkbox"/>	<b>Crew Briefing</b>		
	1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	(OVR) NV090B Ramp 5 Set 100 Trigger 1	1NV-124 fails closed
<input type="checkbox"/>	At direction of examiner	(XMT) SM020 Ramp = 10 Set = 0 Trigger 2	Fails Steam Pressure and Steam Flow Ch.1 Low on C S/G
<input type="checkbox"/>	At direction of examiner	(OVR)IRE002A Off (OVR)IRE002B On (OVR)IRE003A (5 sec. TD) On (OVR)IRE003 (5 sec. TD) In (M) IRE003A Insert (IND) IR001 Analog 8 Trigger 3	Starts unwarranted rod motion and allows rods to stop when placed in Manual.  Clear All in Override section after rod motion has begun.
	At direction of examiner	(MAL) RN007B Trigger 6	Operating RN pump trips

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	At direction of examiner	(XMT) NC0039 Ramp 5 Set 2500 (M) NC003D Set 25% Trigger 4	Allows PZR pressure Channel 2 to fail Hi.
<input type="checkbox"/>	At direction of examiner	(M) SM008B Ramp 900 Set 4. E6 Trigger 5	Steam line break outside containment.
<input type="checkbox"/>			To stop D/Gs when asked LOA D/G 018B STOP pushbutton insert LOA D/G 017A
<input type="checkbox"/>	<b>Terminate the scenario upon direction of Chief Examiner</b>		

**EVENT 1:** Normal Operations PT/1/A/4450/003 A Annulus Ventilation Syst. Train A Operability Test

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO BOP	Determine Required Unit status and Prerequisite System Conditions.	
	SRO	Declare 1A VE Train inoperable	
	BOP	Place 1AVS-D-3 in "MAN" and Close. Place 1AVS-D-2 in "MAN" and Close Ensure 1AVS-D-9 Closed	
	BOP	Start 1A VE Fan	
	BOP	Check: Reset lit for 1A VE Train Preheat Hi Temp. Reset #1 and #2 A VE Preheater On Positive flow indicated across filter package Positive Delta P across any filter within Package	
	BOP	Record date and time of test start	

**Event 2: 1NV-124 Fails Closed**

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	BOP	Recognizes 1NV-124 closing after receiving OAC alarm/Annun. Alarm	Annun. "Letdown Hx Outlet High Pressure"
	SRO	Directs BOP to Place 1NV-124 to manual and restore letdown pressure to normal.	BOP manually opens 1NV-124 to return letdown pressure to about 350#
	CREW	Observe the following trend: <ul style="list-style-type: none"> <li>• Letdown header pressure</li> </ul>	
	SRO	Direct WCC to have WR written and have I&E investigate and repair auto portion of 1NV-124..	Crew should document on CC Card.

**Event 3: Steam Generator "1C" Steam Pressure Channel 1 Failure "LOW".**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses for <b>1AD-4</b> <ul style="list-style-type: none"> <li>• A-2</li> <li>• C-2</li> </ul>	Per annunciator response and AP/06 the operator will swap failed channel to operable channel 1AD-4 A-3, C-3, B-3
	SRO	Enters AP/06 Loss of S/G Feedwater	
	RO	Places Feed Regulator to Manual Restores S/G level to program level	<i>Immediate Action</i>
	RO	Checks the following channel indicating the same: <ul style="list-style-type: none"> <li>• Feed flow</li> <li>• Steam Flow</li> <li>• S/G Level</li> </ul>	<i>Immediate Action</i>  Selects operable channel  <b>Should announce occurrence on page</b>
	RO	Checks the reactor trip breakers closed > P-11	Yes
	RO	Monitor S/G NR Level	If at any time S/G NR Level approaches 17% or 83%, then trip Reactor
	BOP	Check CM/CF feeding S/G	
	BOP	Check "Failure Hold" light on both CF pumps Dark	Yes
	RO	S/G level stable or trending to program	
	BOP	Checks NC temperature with NC pumps on stable or trending to programmed temperature	
	RO	When the following are met then return affected S/G CF control to automatic <ol style="list-style-type: none"> <li>1. Selected control channels indicated correctly <ul style="list-style-type: none"> <li>• Feed flow</li> <li>• Steam flow</li> <li>• S/G level</li> </ul> </li> <li>2. Affected S/G level restored to program level</li> <li>3. Automatic control is desired</li> </ol>	
	RO	Checks proper CF alignment	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Contacts WCC to have WR written, have I&E investigate and repair failed channel and evaluate T.S.. Exit procedure	<b>Failure will not be repaired</b> <b>Tech Spec 3.3.2.4.d.1 / 3.3.2.d.2 / 3.3.4.3.b / 3.3.3.19 / 16.10.1</b>

Event 4: Unwarranted Control Rod motion.

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes control rod movement.	
	SRO	Enters AP/14	
	RO	Checks if more than 1 rod dropped	<i>Immediate Actions</i> No dropped rods.
*	RO	Place control rods in manual and check rod movement stopped	<i>Immediate Actions</i> Rod movement stopped.
<b>Critical</b>	RO	Check all rods aligned with associated bank.	All rods correctly aligned.
	RO	Check "rod control urgent failure alarm" dark.	yes
	RO	Check the following normal <ul style="list-style-type: none"> <li>• Turb. Imp. Pressure Ch.1</li> <li>• T-Ref indication</li> </ul> All 4 NC loop Taves	yes
	RO	Check power range nuclear power normal.	yes
	SRO	Determines Enclosure 4 correct.	Go to enclosure 4. Announce occurrence on paging system.
	SRO	Evaluate prior to any control rod withdrawal <ul style="list-style-type: none"> <li>• No mode change will occur</li> <li>• Control rods withdrawn in conservative manner.</li> </ul>	
	RO	Check the following normal <ul style="list-style-type: none"> <li>• Turb. Imp. Pressure Ch.1</li> <li>• T-Ref indication</li> <li>• All 4 NC loop Taves</li> </ul>	
	SRO	Determines failed channel has not been identified and goes to RNO.	Notifies qualified IAE. Informs operators to maintain T-Ave=TRef. By adjusting turbine load or Borate/dilute NC system.

**EVENT 5: Operating RN pumps trips**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes trip of RN pump	<b>TRIGGER 6</b>
	SRO	Implements AP/20 Loss of RN case 1	
	BOP	Checks for potential loss of LLI as follows: <ul style="list-style-type: none"> <li>• Check Unit 2 RN pump(s) that are aligned to LLI – OPERATING PROPERLY</li> <li>• Check suction flowpath - AVAILABLE</li> </ul>	<b>Examiner Cue:</b> Unit 2 is operating properly.
	RO	Announce occurrence on page.	
	BOP	Place idle RN train in service. <ol style="list-style-type: none"> <li>Check idle RN train – AVAILABLE TO START</li> <li>Start one train of RN as follows: <ul style="list-style-type: none"> <li>• To start 1A RN Pump perform the following: <ol style="list-style-type: none"> <li>Place manual loader for 1RN-89A to 10% open.</li> <li>Start 1A RN Pump.</li> </ol> </li> </ul> </li> <li>Ensure the following valve for train being started – OPEN <ul style="list-style-type: none"> <li>• 1RN-86A</li> </ul> </li> <li>Check is local venting of RN pumps – HAS BEEN PERFORMED per enclosure 6</li> <li>Check Enclosure 8 Cooling Via Gravity – HAS BEEN PERFORMED.</li> <li>Check Case II – HAS BEEN PERFORMED</li> </ol>	<ol style="list-style-type: none"> <li>GO TO Step 3.f</li> <li>GO TO Step 3.h</li> <li>Go to Step 4</li> </ol>
	BOP	Ensure cooling to KC as follows: <ol style="list-style-type: none"> <li>Check 1A KC pump(s) - RUNNING</li> <li>Check 1B KC pump(s) – RUNNING</li> <li>Ensure 1B KC pumps aligned to reactor bldg non essential header as follows: <ol style="list-style-type: none"> <li>OPEN: <ul style="list-style-type: none"> <li>• 1KC-228B</li> <li>• 1KC-18B</li> </ul> </li> <li>Close: <ul style="list-style-type: none"> <li>• 1KC-230A</li> <li>• 1KC-3A</li> </ul> </li> </ol> </li> <li>Check 1B RN pump – RUNNING PROPERLY</li> <li>Check 1RN-187B – LOCALLY THROTTLED</li> <li>Ensure 1B RN pump is off.</li> </ol>	<p>No, go to Step 4.h</p> <p>No, go to Step 4.i</p> <p>NO, Perform the following</p> <ol style="list-style-type: none"> <li>Place 1RN-187B "MODE SELECT" switch to manual.</li> <li>Open 1RN-187B</li> </ol>

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO/ BOP	Perform the following on operating train" <ul style="list-style-type: none"> <li>• A Train</li> <li>• If 1A RN pump is aligned to LLI, THEN throttle 1RN-89A to establish desired flow while attempting to maintain 1A RN Pump flow less than 16,000 GPM.</li> </ul>	
	SRO	.Investigate reason for loss of RN train: <ol style="list-style-type: none"> <li>a. Dispatch operator to check RN pump.</li> <li>a. Dispatch operator to check RN pump breaker.</li> <li>b. Check suction flowpath alignment</li> <li>c. Check discharge flowpath alignment</li> </ol>	
	BOP	Ensure Control Room Area Chiller in service PER Enclosure 3 (VC/YC Operation).	
		Tech Spec evaluation with one D/G and one RN pump inoperable.	

**Event 6: Pressurizer Pressure Channel 2 fails - HIGH**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes failure of Channel 2	
	SRO	Goes to AP/11 Pressurizer Pressure Anomalies	
	BOP	Check actual Pzr pressure – HAS GONE DOWN	
	BOP	Check all PZR pressure channels – INDICATING THE SAME.	If either controlling channels is malfunctioning, THEN place "PZR PRESS CNTRL SELECT" switch to backup channel. Select 1-4.
	BOP	Check Pzr PORVs – CLOSED	No, NC-32B is partially OPEN a. Close PORVs b. If PORV will not close, THEN close PORV isolation valve.
	BOP	Check Pzr spray valves - CLOSED	
	BOP	Check Pzr PORVs - CLOSED	Close 1NC-32B
	BOP	Check Pzr spray valves - CLOSED	
	SRO	Go TO Step 9	
	RO	Announce occurrence on page.	
	BOP	Check 1NV-21A - CLOSED	
	BOP	Check the following Pzr heaters – ON <ul style="list-style-type: none"> <li>• 1A</li> <li>• 1B</li> <li>• 1D</li> </ul>	
	BOP	Check 1C Pzr heaters - ON	
	BOP	Check Pzr pressure – GOING UP TO DESIRED PRESSURE	
	BOP	Check "1NC-27 PRESSURIZER SPRAY EMERGENCY CLOSE" switch – SELECTED TO "NORMAL"	
	BOP	Check "1NC-29 PRESSURIZER SPRAY EMERGENCY CLOSE" switch – SELECTED TO "NORMAL"	
	SRO	GO TO Step 24	
	BOP	Ensure "PZR PRESS REC SELECT" is on operable channel.	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Tech Specs. 3.3.1.6, 3.3.1.8.a, 3.3.1.8.b, 3.3.2.1.d, 3.3.2.3.a.3, 3.3.2.5.a.3, 3.3.2.6.c, 3.3.2.8.b, 3.3.6.3, 3.4.1, 3.4.11	

**Event 7: Steam Leak Requiring Shutdown**

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes symptoms of a steam leak. Reactor power increasing, Tave decreasing	
	SRO	Implements AP/01 Steam Leak	
	CREW	Monitors foldout Page	
	RO	Reduce turbine load to maintain the following: <ul style="list-style-type: none"> <li>• Excore NI's – LESS THAN OR EQUAL TO 100%</li> <li>• NC Loop D/Ts – LESS THAN 60°F D/T</li> </ul> T-ave – AT T-REF	
		Check Pzr level – STABLE OR GOING UP	<p>If level is going down. Perform the following as required to maintain level:</p> <ol style="list-style-type: none"> <li>a. Maintain charging flow less than 175 GPM at all times in subsequent steps.</li> <li>b. Ensure 1NV-238 opening</li> <li>c. Open 1NV-241 while maintaining NC pump seal flow greater than 6 GPM.</li> <li>d. Reduce or isolate letdown.</li> <li>e. Start additional NV pump.</li> <li>f. If Pzr level is going down with maximum charging flow, THEN: <ol style="list-style-type: none"> <li>1. Trip reactor</li> <li>2. Close all MSIVs using individual pushbuttons.</li> <li>3. If reactor tripped in previous step, THEN GO TO E-0.</li> <li>4. If PZR level goes below 4% AND cannot be restored using normal charging, THEN: <ol style="list-style-type: none"> <li>a. Ensure reactor tripped</li> <li>b. WHEN reactor tripped OR auto S/I setpoint reached, THEN ensure S/I initiated.</li> <li>c. GO TO E-0</li> </ol> </li> </ol> </li> </ol>
	CREW	IF AT ANY TIME while in this procedure PZR level can not be maintained stable, THEN perform Step 3.	
	RO	Announce occurrence on paging system	

**Event 8: Steam Line Break Outside Containment**

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enters E-0	
	Crew	Monitors Foldout page	
	RO	Check Reactor Trip: <ul style="list-style-type: none"> <li>• rod bottom lights</li> <li>• reactor trip breakers open</li> <li>• I/R amps decreasing</li> </ul>	<i>Immediate Action</i>
	RO	Check Turbine Generator tripped <ul style="list-style-type: none"> <li>• TV's closed</li> </ul>	<i>Immediate action</i>
	BOP	Check ETA and ETB energized	<i>Immediate action</i>
	RO	Check SI status light - LIT	<i>Immediate action</i>
	BOP	Check LOCA sequencers (A & B) actuated	<i>Immediate action</i>
	SRO/ RO	Announce "Unit 1 Safety Injection" on page	
	BOP	Checks ESF Monitor Light Panel <ul style="list-style-type: none"> <li>• Groups 1,2 and 5 DARK</li> <li>• Group 3 LIT</li> <li>• Checks OAC in service</li> </ul>	
	BOP	Checks Group 4, Rows A thru F LIT as Required	Auto actuation of Phase A is blocked BOP will <ul style="list-style-type: none"> <li>• ensure both trains Phase A Isolation are initiated</li> <li>• Align or start S/I and Phase A components with individual windows in Group 4 as required.</li> <li>• Go to Step 7.f</li> </ul>
	BOP	Check LOCA Sequencer Actuated status light on energized train(s) - LIT	
	BOP	Check the following on Monitor Light Panel Group 4 LIT <ul style="list-style-type: none"> <li>• C-3</li> <li>• C-6</li> <li>• F-4</li> <li>• F-5</li> </ul>	
	RO	Checks CA is running and at least 3 S/G's NR level > 17%	

**Event 8: Steam Line Break Outside Containment**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Checks KC pumps running	
	BOP	Checks RN pumps running	No, 1B RN pump tripped
	SRO	Dispatch operator to stop affected D/G using emergency stop pushbutton.	
	RO BOP	Monitor affected RN cooled components and shut down as necessary.	
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	<b>EXAMINER CUE:</b> • 2A RN pump is running
	RO	Checks all S/G pressures > 775 psig	Probably NO at this time as the 'B' S/G depressurizes  a. Check the following closed: • All MSIVs • All MSIV bypass valves • All SM PORVs b. If any valve open, THEN: • Initiate Main Steam Isolation • If any valve still open, then close valve.
	BOP	Checks Containment pressure has remained less than 3 psig	
	BOP	Checks NV Pump to Cold Leg Flow gauge - indicating flow - YES checks NC pressure < 1600 psig  Check NI pumps indicating flow.	Go to step 15
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 22	<b>EXAMINER CUE:</b> <b>OSM will ensure Generic Enclosure 22 implemented.</b>
	RO	<ul style="list-style-type: none"> <li>• Checks CA flow &gt; 450 gpm and takes control of CA to maintain no load levels</li> <li>• checks VI header pressure &gt; 60 psig</li> <li>• Maintains N/R level between 11% and 50%</li> </ul>	
	BOP	Checks NC pumps ON and Tave stable or trending to 557 degrees	If not stable and decreasing crew will go to Enclosure 3
	BOP	Checks Pzr PORV & Spray Valves closed	
	RO	Checks subcooling > 0 deg.	

**Event 8: Steam Line Break Outside Containment**

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Checks all main steam lines INTACT <ul style="list-style-type: none"> <li>• All S/G pressure – STABLE OR GOING UP</li> <li>• All S/G - PRESSURIZED</li> </ul>	If any S/G is faulted, THEN: <ol style="list-style-type: none"> <li>a. Implement F-0</li> <li>b. GO TO E-2 Faulted Steam Generator Isolation.</li> </ol>


 Should be  
 critical  
 step.

Event 8: E-2 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Monitor Foldout Page	
	CREW	Maintain at least one S/G available for NC System cooldown in subsequent steps.	
	CREW	Maintain any faulted F/G or secondary break isolated during subsequent recovery action unless needed for NC System cooldown.	
	RO	Check the following – CLOSED <ul style="list-style-type: none"> <li>• All MSIVs</li> <li>• All MSIV bypass valves</li> </ul>	NO, 'B' MSIV will be open and can not be closed
	RO	Check at least one S/G pressure – STABLE OR GOING UP	
	RO	Identify faulted S/G(s) <ul style="list-style-type: none"> <li>• Any S/G pressure – GOING DOWN IN AN UNCONTROLLED MANNER</li> <li>• Any S/G - DEPRESSURIZED</li> </ul>	
	RO	Check faulted S/G SM PORV - CLOSED	
	RO	Reset CA modulating valve	
	RO	If TD CA pump is the only source of feedwater, THEN maintain steam flow to if from at least on S/G.	
	RO	Isolate faulted S/G as follows: <ul style="list-style-type: none"> <li>b. For 1B S/G               <ol style="list-style-type: none"> <li>1. Check 'S/G B FDW ISOLATED" status light – LIT</li> <li>2. Close 1CA - 54A</li> <li>3. Close 1CA - 58A</li> <li>4. Dispatch operator to unlock and close:                   <ul style="list-style-type: none"> <li>• 1SA-2</li> <li>• 1SA-78</li> </ul> </li> <li>5. Check BB valves – CLOSED                   <ul style="list-style-type: none"> <li>• 1BB-2B</li> <li>• 1BB-6A</li> </ul> </li> <li>6. Close 1SM-89</li> </ol> </li> </ul>	

**Event 8: E-2 Evaluation**

	BOP	Check is S/G tubes intact	YES
	CREW	<p>Check is S/I termination criteria:</p> <ul style="list-style-type: none"> <li>a. NC subcooling based on core exit T/Cs – GREATER THAN 0° F</li> <li>b. Secondary heat sink</li> <li>c. NC pressure – STABLE OR GOING UP</li> <li>d. Pzr level – GREATER THAN 11%</li> <li>e. GO TO ES 1.1 Safety Injection Termination</li> </ul>	<p>The crew may go to E-1 Loss of Secondary Coolant for a few steps.</p> <p>However, they will ultimately end up in SI termination.</p>

**Event 8: Steam Line Break ES – 1.1 SI Termination**

	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO	Monitor foldout page	
	SOP	Reset the following: a. S/I b. Sequencers c. Phase A isolation d. Phase B isolation	
	CREW	If at any time a B/O signal occurs, then restart S/I equipment previously on.	
	BOP	Establish VI to containment. a. Open the following • 1VI-129B • 1VI-160B • 1VI-150B b. Check VI header pressure – GREATER THAN 85 PSIG.	
	SRO	Check is NS pumps should be stopped: a. Any NS pump - ON	NO, go to Step 5
	BOP	Stop all but one NV pump.	
	BOP	Check NC pressure – STABLE OR GOING UP	
	BOP	Isolate NV S/I flowpath: a. Check NV pump – SUCTION ALIGNED TO FWST b. Check NV pumps miniflow valves – OPEN: • 1NV-150B • 1NV-151A c. Close the following valves: • 1NI-9A • 1NI-10B	

**Event 8: Safety Injection Termination**

Pos.	Expected Actions/ Behavior	Comments
BOP	Establish charging: a. Check VI header pressure – GREATER THAN 60- PSIG. b. Throttle 1NV-238 to maintain 6-10 gpm seal injection flow to each NC pump. c. Close 1NV-241 d. Open the following valves: • 1NV-244A • 1NV-245B e. If at any time charging flow is required to be controlled in subsequent steps, THEN: • Slowly throttle 1NV-241 • Throttle 1NV-238 while maintain seal injection flow. • Maintain charging flow less than 175 gpm.	
BOP	Control charging flow as required to maintain stable Pzr level.	
BOP	Check if NI pumps should be stopped. a. Check NC pressure • Stable or GOING UP • GREATER THAN 1600 PSIG b. Stop NI pumps. c. GO TO Step 11.	
BOP	Check if ND pumps should be stopped. a. Check ND pumps suction – ALIGNED TO FWST b. Stop ND pumps.	
CREW	Check S/I flow not required. a. NC subcooling based on core exit T/Cs – GREATER THAN 0°F. b. Pzr level – GREATER THAN 11%.	



**SHIFT TURNOVER INFORMATION**

**UNIT 1 STATUS:**

Power Level: 100% NCS [B] 963ppm Pzr [B]: 963ppm Xe: Per OAC

Power History: At this power since startup Core Burnup: 250 EFPDs

**CONTROLLING PROCEDURE:** OP/1/A/6100/03 Controlling Procedure for Unit Operation

**OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:**

"1A" Diesel Generator tagged for PM.  
"1A" Motor Driven Auxiliary Feedwater Pump is white tagged for oil sample.  
Unit 2 is available for Auxiliary Steam  
PT/1/A/4450/003 A Annulus Ventilation Syst. Train A Operability Test  
Vibration readings are not required for PT/1/B/4250/028  
Thunderstorms are in the area.

Work Control SRO/Offsite Communicator      **Tim**  
Plant SRO      **Gary**

**NLO's AVAILABLE**

<u>Unit 1</u>	<u>Unit 2</u>
Aux Bldg. Ken	Aux Bldg. John
Turb Bldg. Al	Turb Bldg. Greg
5 <sup>th</sup> Rounds. Tom	
Extra(s) Richard, Fred	

Facility: McGuire	Scenario No.: 2	Op-Test No.: _____	
Examiners: _____ _____	Operators: _____ _____		
Initial Conditions: 100% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged			
Turnover: Maintain present plant conditions			
Event No.	Malf. No.	Event Type*	Event Description
1		I	(RO) Impulse Pressure Channel 1 Fails LOW
2		C	(BOP) Pressurizer Spray Valves Fails OPEN
3		C	(RO) S/G Feedwater Regulating Valve Failure
4		C	(BOP) 'B' NV pump trips
5		N	(BOP) Establish excess letdown
6		C	(CREW) Small Reactor coolant system leak
7		M	Medium size NC system leak with no high head pumps
			'A' High head pump trips on SI
			No automatic Safety Injection
			'A' ND pump recirculation valve fails closed on SI

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 22

TOPIC: Nuclear Regulatory Commission Simulator Exam

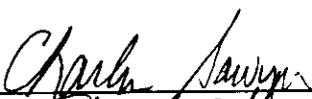
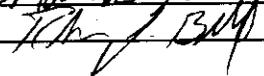
Scenario 2

**REFERENCES:**

1. McGuire Technical Specifications
2. AP/1/A/5500/04 Rapid Downpower
3. AP/1/A/5500/06 Loss of S/G Feedwater
4. AP/1/A/5500/10 NC System Leakage
5. AP/1/A/5500/11 Pressurizer Pressure Anomalies
6. AP/1/A/5500/14 Rod Control Malfunction
7. AP/1/A/5500/12 Loss of Letdown, Charging or Seal Injection
8. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
9. EP/1/A/5000/E-1 Loss of Reactor or Secondary Coolant
10. EP/1/A/5000/ES 1.2 Post LOCA Cooldown and Depressurization
11. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:

  
\_\_\_\_\_  
  
\_\_\_\_\_

Nov. 23, 2004

Rev. 1

## EVENT SUMMARY

1. Impulse Pressure channel 1 fails low.
2. Pressurizer spray valve fails open.
3. Feed regulating valve failure. Enter AP-6
4. Operating charging pump trips Enter AP-12
5. Small reactor coolant leak AP/10
6. Medium size LOCA with no high head injection

### SIMULATOR OPERATOR INSTRUCTIONS

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC - 122	
<input type="checkbox"/>		RUN	
<input type="checkbox"/>		<b>Update</b> Status Board,  <b>Setup</b> OAC  <b>Setup</b> ICCM, Turbine Displays, & Trend Recorders.  <b>Check</b> Rod Step Counters agree with rod positions	See Shift Turnover Information
<input type="checkbox"/>		<b>(M) EPQ001A</b>  <b>Set = 1</b>	Loss of D/G "1A" Control Power
<input type="checkbox"/>		<b>(LOA) CA009</b>  <b>Set = F</b>	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		<b>(OVR) ND012A – ON</b> <b>(OVR) ND012B – OFF</b> <b>(OVR) ND012C - OFF</b>	Fails '1A' ND pump recirc valve closed on SI
<input type="checkbox"/>			

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>		(M) ISE002A (M) ISE002B	Failure of automatic Safety Injection – both trains
<input type="checkbox"/>		Freeze.	
<input type="checkbox"/>		Update Fresh Tech. Spec. Log.	
<input type="checkbox"/>		Fill out the NLO's Available section of Shift Turnover Info.	
<input type="checkbox"/>	Prior to Crew Briefing	RUN	
<input type="checkbox"/>	<b>Crew Briefing</b>		
	1. Assign Crew Positions based on evaluation requirements 2. Review the Shift Turnover Information with the crew. 3. Direct the crew to Review the Control Boards taking note of present conditions, alarms.		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	(XMT) SM003 Ramp 60 Set 0 Trigger 1	Channel 1 Impulse Pressure fails low
<input type="checkbox"/>	At direction of examiner	(MAL) ILE03A Ramp = 30 Set = 100 Trigger 2	Pressurizer Spray Valve fails open
<input type="checkbox"/>	At direction of examiner	(MAL) IFE009D Ramp 30 Set = 100 Trigger 3	Feedwater regulating valve fails open – must go to backup control
	At direction of examiner	(MAL) NV029B Trigger 4	Operating NV pump trips
		(MAL) NV020E Set 0	Fails 1NV-35A closed after it is manually closed

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	At direction of examiner	(MAL) NC007A Ramp 900 Set .65 Trigger 5	NC system leak on 'A' loop
<input type="checkbox"/>	At direction of examiner	(MAL) NV Trigger 6	Trip 'A' NV pump 30 seconds after SI
<input type="checkbox"/>			
<input type="checkbox"/>	<b>Terminate the scenario upon direction of Chief Examiner</b>		

**EVENT 1: Channel 1 Impulse Pressure Fails Low**

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes control rod movement.	
	SRO	Enters AP/14	
	RO	Checks if more than 1 rod dropped	<i>Immediate Actions</i> No dropped rods
<b>*</b> <b>Critical</b>	RO	Place control rods in manual and check rod movement stopped	<i>Immediate Actions</i> Rod movement stopped.
	RO	Check all rods aligned with associated bank.	All rods correctly aligned.
	RO	Check "rod control urgent failure alarm" dark.	yes
	RO	Check the following reactor control instruments NORMAL: <ul style="list-style-type: none"> <li>• TURB IMP PRESS CH 1</li> <li>• T-ref indication</li> <li>• 1A NC LOOP T-AVE</li> <li>• 1B NC LOOP T-AVE</li> <li>• 1C NC LOOP T-AVE</li> <li>• 1D NC LOOP T-AVE</li> </ul>	
	SRO	Determines Enclosure 4 correct.	Go to enclosure 4. Announce occurrence on paging system.
	SRO	Evaluate prior to any control rod withdrawal <ul style="list-style-type: none"> <li>• No mode change will occur</li> <li>• Control rods withdrawn in conservative manner.</li> </ul>	
	RO	Check the following normal <ul style="list-style-type: none"> <li>• Turb. Imp. Pressure Ch.1</li> <li>• T-Ref indication</li> <li>• All 4 NC loop Taves</li> </ul>	
	SRO	Determines failed channel has been identified and goes to RNO.	If "TURB IMP PRESS CH-1" failed, THEN ensure P-7 and P-13 are in correct state for unit conditions. Notifies qualified IAE. Informs operators to maintain T-Ave=TRef. By adjusting turbine load or Borate/dilute NC system.
	SRO	Checks T-ave loop - NORMAL	
	SRO	Checks failed channel – HAS BEEN IDENTIFIED When problem is repaired Exit procedure	FAILURE WILL NOT BE REPAIRED

**Event 2: Pressurizer Pressure Spray Valve Fails OPEN**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes failure of Spray Valve	
	SRO	Goes to AP/11 Pressurizer Pressure Anomalies	
	BOP	Check actual Pzr pressure – HAS GONE DOWN	
	BOP	Check all PZR pressure channels – INDICATING THE SAME.	
	BOP	Check Pzr PORVs – CLOSED	
	BOP	Check Pzr spray valves - CLOSED	NO a. Close PORVs b. If PORV will not close, THEN close PORV isolation valve
	BOP	Check Pzr PORVs - CLOSED	
	BOP	Check Pzr spray valves - CLOSED	NO a. Ensure Pzr spray emergency close switch on 1MC-10 is in the "CLOSE" position for failed spray valve. b. If Pzr spray valve closed, THEN GO TO Step 9.
	RO	Announce occurrence on page.	
	BOP	Check 1NV-21A - CLOSED	
	BOP	Check the following Pzr heaters – ON <ul style="list-style-type: none"> <li>• 1A</li> <li>• 1B</li> <li>• 1D</li> </ul>	
	BOP	Check 1C Pzr heaters - ON	
	BOP	Check Pzr pressure – GOING UP TO DESIRED PRESSURE	
	BOP	Check "1NC-27 PRESSURIZER SPRAY EMERGENCY CLOSE" switch – SELECTED TO "NORMAL"	
	BOP	Check "1NC-29 PRESSURIZER SPRAY EMERGENCY CLOSE" switch – SELECTED TO "NORMAL"	
	SRO	GO TO Step 24	
	BOP	Ensure "PZR PRESS REC SELECT" is on operable channel.	
		End of procedure	

**Event 3: Steam Generator Regulating Valve Failure**

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Recognizes failure of regulating valve	
	SRO	Enters AP/06 Loss of S/G Feedwater	
	RO	Places Feed Regulator to Manual Restores S/G level to program level	<i>Immediate Action</i> If CF control valve is not responding THEN: 1. Swap CF control valve "SELECTOR SWITCH" to other circuit. • "ALT" OR • "NORM" 2. Restore S/G level to program.
	RO	Checks the following channel indicating the same: • Feed flow • Steam Flow • S/G Level	<i>Immediate Action</i>  Selects operable channel
	RO	Announce occurrence on page.	
	RO	Checks the reactor trip breakers closed > P-11	Yes
	RO	Monitor S/G NR Level	
	RO	If at any time S/G NR Level approaches 17% or 83%, THEN: • trip Reactor • GO TO E-0	
	RO	Check reactor power – GREATER THAN 3%.	
	BOP	Check CM/CF feeding S/G	
	RO	Check "FAILURE HOLD" light on both CF pumps - DARK	
	RO	S/G level stable or trending to program	
	BOP	Checks NC temperature with NC pumps on stable or trending to programmed temperature	

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Check all S/G CF control valves – IN AUTO.	When the following are met then return affected S/G CF control to automatic: <ul style="list-style-type: none"> <li>• Automatic control desired</li> <li>• Affected S/G level – AT PROGRAM LEVEL</li> <li>• Selected control channels indicated correctly</li> <li>• Feed flow</li> <li>• Steam flow</li> <li>• S/G level</li> </ul>
	RO	Checks ALL S/G control bypass valves – IN MANUAL AND FULL OPEN.	
	RO	Check both CF pumps – IN AUTO	
	RO	Check all CA pumps – OFF.	
	SRO	Contacts WCC to have WR written, have I&E investigate and repair failed valve  Exit procedure	<b>Failure will not be repaired</b>

**EVENTS 4 and 5: Operating NV pumps trips**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes loss of charging	
	SRO	Implements AP/12 Loss of Letdown, Charging or Seal Injection.	
	BOP	If a loss of charging through the Regenerative HX has occurred, THEN ensure the following are closed: <ul style="list-style-type: none"> <li>• 1NV-458A</li> <li>• 1NV-457A</li> <li>• 1NV-35A</li> </ul>	
	BOP	Check Pzr level – LESS THAN 96%.	
	BOP	IF AT ANY TIME “REGEN HX LETDN HI TEMP” alarms, THEN close the following valves: <ul style="list-style-type: none"> <li>• 1NV-1A</li> <li>• 1NV-2A</li> </ul>	
	RO	Stop any power or temperature changes in progress.	
	RO	Announce occurrence on page.	
	SRO	If this AP entered due to loss of letdown only, THEN GO TO Step 36.	No
	SRO	Check any of the following charging pumps – ON. <ul style="list-style-type: none"> <li>• 1A NV pump</li> <li>or</li> <li>• 1B NV pump</li> <li>or</li> <li>• PD pump</li> </ul>	If all pumps off THEN GO TO Step 11.
	BOP	Monitor NC pump parameters. <ul style="list-style-type: none"> <li>• Lower bearing temperature – LESS THAN 225°F</li> <li>• Number one seal outlet temperature – LESS THAN 235°F</li> <li>• NC PUMP HI-HI VIBRATION alarm - DARK</li> </ul>	

	SRO	IF AT ANY TIME NC pump temperatures reach trip criteria OR continuous HI-HI vibration alarm occurs, THEN trips the associated NC pumps as follows:  a. Close spray valve on affect NC pump b. Stop any dilution in progress c. If in Mode 1 or 2, THEN <ul style="list-style-type: none"> <li>• Trip reactor</li> <li>• Stop affected NC pump</li> <li>• GO TO E-0 while continuing with this procedure.</li> </ul> d. Stop affected NC pump.	
	BOP	Check NC pump thermal barriers as follows: a. check the following valves OPEN <ul style="list-style-type: none"> <li>• 1KC-394A</li> <li>• 1KC-345A</li> <li>• 1KC-364B</li> <li>• 1KC-413B</li> </ul>	
	BOP	Check "SEAL WATER INJ FILTER HI D/P" alarm - DARK	
	BOP	Align NV pump to available suction source: a. Check VCT – AVAILABLE AS SUCTION SOURCE  b. Ensure the following valves are open: <ul style="list-style-type: none"> <li>• 1NV-141A</li> <li>• 1NV-142B</li> </ul>	
	BOP	Check if gas binding of NV pumps – SUSPECTED <ul style="list-style-type: none"> <li>• NV pump showed signs of cavitation while running.</li> </ul> OR <ul style="list-style-type: none"> <li>• Loss of suction to the NV pumps has occurred.</li> </ul>	NO, GO TO Step 20.
	BOP	Check any of the following charging pumps – ON <ul style="list-style-type: none"> <li>• 1A NV pump</li> </ul> OR <ul style="list-style-type: none"> <li>• 1B NV pump</li> </ul> OR <ul style="list-style-type: none"> <li>• PD pump</li> </ul>	Open 1NV-241, Close 1NV-238
	BOP	Check both of the following – OPEN <ul style="list-style-type: none"> <li>• 1NV-244A</li> <li>• 1NV-245B</li> </ul>	
	BOP	Check one of the following – OPEN <ul style="list-style-type: none"> <li>• 1NV-13B</li> </ul> OR <ul style="list-style-type: none"> <li>• 1NV-16A</li> </ul>	
	BOP	Check all NC pumps - ON	

	BOP	Check any of the following charging pumps – ON <ul style="list-style-type: none"> <li>• 1A NV pump</li> </ul> OR <ul style="list-style-type: none"> <li>• 1B NV pump</li> </ul> OR <ul style="list-style-type: none"> <li>• PD pump</li> </ul>	If all pumps off then GO TO Step 26.
	BOP	Start 1A or 1B NV pump as follows: a. Start associated NV lube oil pump b. Start 1A or 1B NV pump. c. Place associated NV Lube Oil pump in - AUTO	
	BOP	Check any of the following charging pumps – ON <ul style="list-style-type: none"> <li>• 1A NV pump</li> </ul> OR <ul style="list-style-type: none"> <li>• 1B NV pump</li> </ul> OR <ul style="list-style-type: none"> <li>• PD pump</li> </ul>	
	BOP	Check seal injection flow to any NC pump – LESS THAN 6 GPM.	
	BOP	Slowly restore seal injection flow to limit cooldown of NC pump lower bearing temperature to 1°F per minute by performing the following concurrently: a. monitor NC pump lower bearing temperatures b. slowly establish charging – throttle open 1NV-238 c. slowly raise seal injection flow by throttling close 1NV-241.	
	BOP	Check seal injection flow – ESTABLISHED  GO TO Step 33	
	SRO	Check Unit 1 Standby Makeup pump - OFF	
	SRO	Check normal or excess letdown in service.	NO, GO TO Step 36
	BOP	Ensure the following are closed: <ul style="list-style-type: none"> <li>• 1NV-458A</li> <li>• 1NV-457A</li> <li>• 1NV-35A</li> </ul>	
	BOP	Ensure “NC Sys MU Controller” in “AUTO”	
	SRO	Ensure charging flow going down to maintain Pzr at program level.	
	BOP	Check “LETDN RELIEF HI TEMP” alarm HAS REMAINED DARK.	
	BOP	Check 1NV-21A - CLOSED	

**Events 4 and 5: Operating NV pump trips and loss of letdown**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Operate Pzr heaters as follows: a. Check all Pzr heater group supply breakers - CLOSED b. check normal Pzr spray – AVAILABLE c. Place the following Pzr heater groups in manual and “ON” to maximize spray. <ul style="list-style-type: none"> <li>• A</li> <li>• B</li> <li>• D</li> </ul>	
	BOP	Check the following valves – OPEN <ul style="list-style-type: none"> <li>• 1NV-1A</li> <li>• 1NV-2A</li> </ul>	
	SRO	GO TO Step 48	
	BOP	Establish normal letdown: a. Ensure 1NV-459 is closed b. Place 1NV-124 in manual between 10-20% open. c. Check the following – OPEN: <ul style="list-style-type: none"> <li>• 1NV-1A</li> <li>• 1NV-2A</li> </ul> d. Establish cooling to Regen HX by performing the following concurrently: <ul style="list-style-type: none"> <li>• establish at least 65 gpm charging flow by throttling 1NV-238</li> <li>• throttle 1NV-241 to establish approximately 8 gpm seal injection flow per NC pump.</li> </ul> e. Open letdown line isolation valves: <ul style="list-style-type: none"> <li>• INV-7B</li> <li>• 1NV-1A</li> <li>• 1NV-2A</li> <li>• 1NV-35A</li> </ul> f. Check normal letdown – ISOLATED LESS THAN 1 HOUR..	1NV-35A will not open Crew will have to place excess letdown in service. Go to Step 49

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Establish excess letdown: a. Adjust charging to minimum while maintaining the following: <ul style="list-style-type: none"> <li>• NC pump seal injection flow greater than 6 gpm.</li> <li>• Pzr level at program level</li> </ul> b. Open the following: <ul style="list-style-type: none"> <li>• 1KC-315B</li> <li>• 1KC-305B</li> </ul> c. Place 1NV-27B to "VCT" position. d. Open then close 1NV-26 f. Check the following valves – OPEN <ul style="list-style-type: none"> <li>• 1NV-94AC</li> <li>• 1NV_95B</li> </ul> g. Open 1NV-24B h. Open 1NV-25B i. Slowly open 1NV-26 while maintaining excess letdown HX temperature less than 200°F j. GO TO Step 49.n n. Notify Chemistry excess letdown in service. o. Adjust charging flow was desired while maintaining: <ul style="list-style-type: none"> <li>• NC pump seal injection flow greater than 6 gpm</li> <li>• Pzr level at program level.</li> </ul>	
		Tech Spec evaluation for inoperable NV pump. 3.5.2 and SLC 16.9.9 3.6.1	

**Event 6: Reactor Coolant System Leakage**

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes symptoms of NC system leak	
	SRO	Enters AP-10 Case 2	
	SRO	Check containment entry – IN PROGRESSS	<b>Examiner Cue:</b> No entry in progress
	SRO	Check leak – KNOWN TO BE IN THE AUX BUILDING.	
	BOP	Check Pzr level – STABLE OR GOING UP.	
	BOP	Performs the following <ul style="list-style-type: none"> <li>• Charging flow &lt;200 gpm</li> <li>• Ensures 1NV-238 opening</li> <li>• Open 1NV-241 maintain 6 gpm seal flow</li> <li>• Isolate excess letdown</li> <li>• Start additional NV pump</li> </ul>	None available.
	SRO	IF PZR level going down with max Charging flow Direct Tripping of Reactor and ensure S/I initiated.	At some point the crew will take this action.  <b>When Safety Injection is actuated the running NV pump will also trip.</b>  <b>NO high head injection will be available.</b>

Event 7 Small LOCA

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to E-0 and directs activities	
	SRO	Reviews Foldout page with crew	
	RO	Report Reactor Trip: <ul style="list-style-type: none"> <li>• rod bottom lights</li> <li>• reactor trip breakers open</li> <li>• I/R amps decreasing</li> </ul>	<i>Immediate Action</i>
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> <li>• TV's closed</li> </ul>	<i>Immediate Action</i>
	BOP	Reports ETA and ETB energized	<i>Immediate Action</i>
	RO	Reports SI status light - not LIT	<i>Immediate Action</i> S/I will be manually initiated
	BOP	Report LOCA sequencers (A & B) actuated	<i>Immediate Action</i>
	RO	Announce "Unit 1 Safety Injection" on page	
	BOP	Checks ESF Monitor Light Panel <ul style="list-style-type: none"> <li>• Groups 1,2 and 5 DARK</li> <li>• Group 3 LIT</li> <li>• Checks OAC in service</li> </ul>	
	BOP	Reports all Ss and St components in Group 4 LIT	A and B NV pumps off (Group 4)
	RO	Reports that CA is running and at least 3 S/G's NR level > 17%	
	BOP	Reports KC pumps running	
	BOP	Reports RN pumps running	
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	<b>EXAMINER CUE:</b> <ul style="list-style-type: none"> <li>• 2A RN pump is running</li> </ul>
	RO	Checks/reports all S/G pressures > 775 psig	
	BOP	Reports Containment pressure has not remained less than 3 psig	
	SRO	Record time of reactor trip	
	BOP	Reports Monitor Light Group 4, Row G, lit	
	BOP	Stop all NC pumps while maintaining seal injection	
	BOP	Secure RV pumps	
	BOP	Energize H2 Igniters	

Event 7 Small LOCA

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Dispatch operator to secure all NF AHUs	
	BOP	Perform Encl. 2	
	BOP	Report NV Pump to Cold Leg Flow gauge - indicating flow - YES <ul style="list-style-type: none"> <li>• checks NC pressure &lt; 1600 psig</li> <li>• checks NI pumps indicating flow</li> </ul>	Depending on pressure the crew may check ND pump miniflow valves OPEN and stop ND pumps.
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 22	<b>EXAMINER CUE:</b> <b>OSM will ensure Generic Enclosure 22 is implemented.</b>
	RO	<ul style="list-style-type: none"> <li>• Checks CA flow &gt; 450 gpm and takes control of CA to maintain no load levels</li> <li>• checks VI header pressure &gt; 60 psig</li> <li>• Maintains N/R level between 11% and 50%</li> </ul>	
	BOP	<ul style="list-style-type: none"> <li>• If any NC pump ON, then check Tave stable or trending to 557 degrees</li> <li>• If all NC pumps off, then check NC T-colds stable or trending to 557 degrees.</li> </ul>	If not stable and decreasing crew will go to Enclosure 3
	BOP	Reports Pzr PORV & Spray Valves closed	
	BOP	Reports subcooling > 0 deg.	
	BOP	Reports all main steam lines INTACT	
	RO/ BOP	Report S/G tube rupture parameters indicate that S/G tubes intact	
	BOP	Checks if NC system is intact: <ul style="list-style-type: none"> <li>• Containment EMFs – normal</li> <li>• Ice Condenser Lower Inlet Doors Open alarm – DARK</li> <li>• Containment pressure &lt; 1 psig</li> <li>• Containment sump level normal</li> </ul>	Energize H2 igniters, stop All U-1 NF AHUs
	SRO	Implement F-0	
	CREW	Evaluate CSF trees	
	SRO	Enter EP-E-1	

## Event 7

## E-1 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enters E-1	
	SRO	Reviews fold out page with crew and reminds crew to monitor FWST level for 180 inches (Lo level)	<b>NOTE:</b> When FWST decreases to 180 inches, the crew should enter EP/ES-1.3 and manually swap to sump
	RO	Reports subcooling less than 0	
	RO	Reports main steam lines INTACT • All S/G pressures - STABLE OR GOING UP • All S/Gs - PRESSURIZED	
	RO	Checks S/G level > 11%. Resets CA Modulating Valves Reset switches and throttles CA flow as necessary to maintain 11-50%	
	RO	Checks secondary EMFs - NORMAL	
	BOP	Reports Pzr PORV Isol Valves open & energized and Pzr PORVs closed	
	SRO/ RO	Checks SI Termination Criteria NOT met Go to step 7f	
	BOP	Checks NS status: • NS pumps - ON • checks containment pressure < 2psig Go to step 9	
	SRO/ BOP	Checks ND pumps on and aligned to FWST Check NC pressure > 286 psig NC pressure – Stable or going up Reset – SI and D/G Sequencers	
	BOP	Check NC and S/G pressures: a. All S/G pressures – STABLE OR GOING UP b. NC pressure – STABLE OR GOING DOWN	
	SRO	Check if D/Gs should be stopped: a. Check any D/G – ON b. Reset the following – SI and Sequencers c. Dispatch an operator to stop D/Gs	Use LOA DG 017 and 018 to stop D/Gs
	SRO	Dispatch operators to locally stop NF AHUs and place H2 Analyzers in service.	<b>Examiner Cue:</b> NLO has been dispatched to place H2 analyzers in service.

**Event 7      Small LOCA**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Evaluate plant status: 1) Any ND pump available 2) Power available to 1ND-19A 1NI-185A 1ND-58A 1ND-4B 1NI-184B 1NI-136B 1NI-332A 1NI-333B 1NI-334B 1NI-147A 1NI-115B 1NI-144B 3) S Latch LIT for: 1NI-184B 1NI-185A 4) EMF-41 NORMAL 5) All area monitors NORMAL 6) Notify Chemistry to sample appropriately 7) Notify RP to sample Cont air 8) Consult Station Management on recovery	
	BOP	Report NC pressure > 286 psig GO TO EP-ES 1.2 Post LOCA Cooldown and Depressurization.	

Event 7

Post LOCA Cooldown and Depressurization Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO CREW	Implement ES 1.2 Monitor foldout page.	
	BOP	Reset the following SI, Sequencers and Phase "A" Isolation	
	BOP	Check is ND pumps should be stopped Any NS pump on – NO go to step 4	
	BOP	Evaluate plant status: 1) Any ND pump available 2) Power available to 1ND-19A 1NI-185A 1ND-58A 1ND-4B 1NI-184B 1NI-136B 1NI-332A 1NI-333B 1NI-334B 1NI-147A 1NI-115B 1NI-144B 3) S Latch LIT for: 1NI-184B 1NI-185A 4) EMF-41 NORMAL 5) All area monitors NORMAL 6) EMF 46A and 46B NORMAL 7) KC surge tanks levels 8) Notify Chemistry to sample appropriately 9) Consult Station Management on recovery	Stable. When TSC is staffed
	BOP	Establish VI to containment: a. Open the following: • 1VI-129B • 1VI-160B • 1VI-150B b. Check VI header pressure – GREATER THAN 85 PSIG.	
	Bop	Check 1ETA and 1ETB – ENERGIZED BY OFFSITE POWER	
	Bop	Check if ND pumps should be stopped: a. Any ND pump – ON no go to step 7.f b. If pressure goes below 286 psig start ND pumps	Stop ND pumps
	RO	a. Check S/G Level in any intact S/G than 11% b. Throttle feed flow to maintain all intact S/G NR levels between 11% and 50%	

Event 7

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Monitor shutdown margin during cooldown as follows: 1) Shutdown margin calculation 2) Check shutdown margin - ADEQUATE	
	SRO	WHEN "P-11" PRESSURIZER S/I BLOCK PERMISSIVE" status light lit, THEN depress "BLOCK" on Low Pressure Steamline Isolation block switches.	
	RO & BOP	Initiate a NC system cooldown to Cold Shutdown as follows:  a. If ND in RHR mode, then use ND to cooldown - NO  b. Check "C-9 COND AVAILABLE FOR STEAM DUMP" status light - LIT  c. MSIV on intact S/Gs OPEN  d. Perform the following to place steam dumps in steam pressure mode.  1) Place "STM PRESS CONTROLLER" in manual 2) Adjust "STM PRESS CONTROLLER " output to equal "STEAM DUMP DEMAND" signal. 3) Place "STEAM DUMP SELECT" in steam pressure mode.  e. WHEN P-12 LO-LO TAVE status light LIT then place steam dumps in bypass interlock.  f. Dump steam to dump condenser from intact S/Gs while maintain cooldown rate in NC T-colds less than 100°F in an hour.	← <i>cooldown step</i>
	RO	Check NC subcooling based on core exit T/C - GREATER THAN 0°F	
	BOP	Check is S/I in service using any of the following: <ul style="list-style-type: none"> <li>• Any NI pump - ON</li> <li>OR</li> <li>• 1NI-9A - OPEN</li> <li>OR</li> <li>• 1NI-10B - OPEN</li> <li>OR</li> <li>• Any ND pump - ON WITH SUCTION ALIGNED TO FWST OR SUMP.</li> </ul>	

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Place all PZR heaters in manual and off.	
	BOP	Depressurize the NC system to refill the PZR a. Use normal spray until PZR level is – GREATER THAN 25% b. Check Pzr level – GREATER THAN 25% c. Close valves used for depressurization.	
	BOP	Check if one NV pump should be stopped: a. both NV pumps – ON -- NO	Go to Step 19.
	BOP	Check if one NI pump should be stopped: a. Any NI pump – ON - YES b. Determine required subcooling from table	Crew may stop one NI pump based on subcooling.
	BOP	Check if normal charging should be established: a. check the following: • Both NI pumps – OFF • Only 1 NV pump - ON	NO go to step 27.
Terminate Scenario			

**Note to Examiner: Be sure SRO classifies event at end of scenario.**

**1) Classification of Event: Alert due to 4.1.A.1**

**SHIFT TURNOVER INFORMATION**

**UNIT 1 STATUS:**

Power Level: 100% NCS [B] 83 ppm Pzr [B]: 83 ppm Xe: Per OAC

Power History: At this power since startup Core Burnup: 485 EFPDs

**CONTROLLING PROCEDURE:** OP/1/A/6100/03 Controlling Procedure for Unit Operation

**OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:**

"1A" Diesel Generator tagged for PM.  
"1A" Motor Driven Auxiliary Feedwater Pump is white tagged for oil sample.  
Unit 2 is available for Auxiliary Steam  
Thunderstorms are in the area.

Maintain present plant conditions.

<b>Work Control SRO/Offsite Communicator</b>	<b>Tim</b>
<b>Plant SRO</b>	<b>Gary</b>

**NLO's AVAILABLE**

**Unit 1**

**Aux Bldg. Ken**

**Turb Bldg. Al**

**5<sup>th</sup> Rounds. Tom**

**Extra(s) Richard, Fred**

**Unit 2**

**Aux Bldg. John**

**Turb Bldg. Greg**

Facility: McGuire	Scenario No.: 3	Op-Test No.: _____
Examiners: _____	Operators: _____	_____
_____	_____	_____
Initial Conditions: 40% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged		
_____		
Turnover: Reduce turbine load for TVMT		
_____		

Event No.	Malf. No.	Event Type*	Event Description
1		N	(CREW) Reduce Load for Turbine Valve Movement Test
2		C	(BOP) ETB Ground Fault – Diesel Will not Start
3		I	(RO) S/B 1B Channel 1 Narrow Range Level Fails HIGH
4		C	(BOP) Pressurizer Pressure Master Failure
5		C	(RO) Low Frequency 58.8
6		R	(CREW) Load Reduction
7		M	Loss of All AC Power
			Reactor Coolant Pump '1A' Seal Failure

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 22

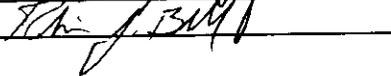
TOPIC: Nuclear Regulatory Commission Simulator Exam  
Scenario 3

**REFERENCES:**

1. McGuire Technical Specifications
2. OP/1/A/6100/003 Controlling Procedure for Unit Operator
3. AP/1/A/5500/03 Load Rejection
4. AP/1/A/5500/05 Generator Voltage and Electric Grid Disturbances
5. AP/1/A/5500/06 Loss of S/G Feedwater
6. AP/1/A/5500/07 Loss of Electrical Power
7. AP/1/A/5500/12 Loss of Letdown, Charging or Seal Injection
8. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
9. EP/1/A/5000/ECA 0.0 Loss of All AC Power
10. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:

  
\_\_\_\_\_  
  
\_\_\_\_\_

Nov. 24, 2004  
Rev. 1

## EVENT SUMMARY

1. Reduce turbine load for Throttle Valve Movement Test.
2. 1ETB Blackout on bus due to ground fault. Enter AP-7
3. S/G B Level Channel 1 High. Enter AP-6
4. Pressurizer Master Fails
5. Decrease in system frequency. Enter AP-05
6. Load reduction per AP -03 as a result of decrease in system frequency
7. Loss of all AC Power.

### SIMULATOR OPERATOR INSTRUCTIONS

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	Sim. Setup	<b>Rod Step On</b>	
<input type="checkbox"/>		<b>IC - 123</b>	
<input type="checkbox"/>		<b>RUN</b>	
<input type="checkbox"/>		<b>Update Status Board,</b>  <b>Setup OAC</b>  <b>Setup ICCM, Turbine Displays, &amp; Trend Recorders.</b>  <b>Check Rod Step Counters agree with rod positions</b>	See Shift Turnover Information
<input type="checkbox"/>		<b>(M) EPQ001A</b>  <b>Set = 1</b>	Loss of D/G "1A" Control Power
<input type="checkbox"/>		<b>(LOA) CA009</b>  <b>Set = F</b>	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		<b>(M) DG004B</b>	Diesel Trips on Overspeed
<input type="checkbox"/>			

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>		<b>Freeze.</b>	
<input type="checkbox"/>		<b>Update Fresh Tech. Spec. Log.</b>	
<input type="checkbox"/>		<b>Fill out the NLO's Available section of Shift Turnover Info.</b>	
<input type="checkbox"/>	Prior to Crew Briefing	<b>RUN</b>	
<input type="checkbox"/>	<b>Crew Briefing</b>		
	<ol style="list-style-type: none"> <li>1. Assign Crew Positions based on evaluation requirements</li> <li>2. Review the Shift Turnover Information with the crew.</li> <li>3. Direct the crew to Review the Control Boards taking note of present conditions, alarms.</li> </ol>		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	<b>(MAL) EP008B Trigger 1</b>	Loss of ETB - Bus lockout – Diesel will not start
<input type="checkbox"/>	At direction of examiner	<b>(XMT) CF026 Set = 0 Ramp 10 Trigger 2</b>	Fails S/G "B" Narrow Range Level Channel 1 LOW
<input type="checkbox"/>	At direction of examine	<b>(MAL) ILE001 Trigger 3</b>	Fails Pressurizer Pressure Master
<input type="checkbox"/>	At direction of examine	<b>(PLP) Set 58.8 Ramp 300 Trigger 4</b>	Decreases system frequency to 58.8 Hz.  Delete Malfunction after separated from grid

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	At direction of examiner	(OVR) MT002A - 14 MT002B - 15 MT003A - 14 MT003B - 15 MT004B - 14  Set = 14 Ramp 60 Trigger 5	Increases turbine vibration
<input type="checkbox"/>	After Turbine Tripped	(M) NCP008A (M) NCP009A (M) NCP010	Fails NCP '1A' seals
<input type="checkbox"/>		CAEP ZZRUNSSF	Starts the SSF
<input type="checkbox"/>		(LOA) KC007C (LOA) KC007D	Loses KC 228B and KC 18B
		(LOA) EP017 Close ATL	
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

**EVENT 1: Normal Operations – Reduce turbine load**

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO	SRO will use OP/1/A/6100/003 Controlling procedure for unit operation Enclosure 2.	
	BOP	Operates Pzr heater groups as desired	
	RO	Reduce turbine load per procedure OP/1/A/6100/001A Turbine Generator Load Change.  Will enter a desired reference load and desired rate of change then press go.	
	RO	At 98% RTP will depress MW IN/MW OUT  Will ensure lit "MW IN"	
	RO		
	RO		
	RO SRO		

Event 2: B/O 1ETB Ground Fault

Time	Pos.	Expected	Comments
	Crew	Recognizes loss of o	
	SRO	Enters AP/07 Case 2	
	BOP	Checks bus energize loads	ig Immediate Actions The D/G will not start due to a ground fault on 1ETB.
	BOP	If both NV pumps off, letdown. Start opposite train: <ul style="list-style-type: none"> <li>NV pump</li> <li>KC pump</li> <li>RN pump</li> </ul> Go to step 3	Immediate Actions <del>Fail valve closed used to isolate letdown - will have to use excess letdown.</del>
	BOP	Verifies NO Safety Injection has occurred If both NV pumps off then isolate: <ul style="list-style-type: none"> <li>Excess letdown</li> <li>ND letdown</li> </ul> If any pump was manually started per step 1 go to step 5	"A" train NV pump will be on
	BOP	Check D/Gs - OFF	yes
	BOP	Check ND system in RHR mode at time of B/O	No Go to step 7
	BOP	Align KC as follows: <ul style="list-style-type: none"> <li>Places 1KC-51A to AUTO</li> <li>Ensures the following are open                             <ol style="list-style-type: none"> <li>1KC-3A</li> <li>1KC-230A</li> <li>1KC-394A</li> <li>1KC-345A</li> </ol> </li> <li>If needed keep thermal barrier valves open raise KC flow to KF Hx by opening 1KC-149</li> <li>Ensures KC flow is less than 4000 gpm per operating KC pump</li> </ul>	
	BOP	Checks any charging pump - Running - YES	
	BOP	Align RN as follows: <ul style="list-style-type: none"> <li>Check 1A RN pump - Running - YES</li> <li>Ensure 1RN-86A is open</li> <li>Close 1RN-43A</li> <li>Throttle 1RN-89A to desired cooling</li> </ul>	
	SRO	Notifies Unit 2 RO to start 2A RN pump	<b>EXAMINER CUE:</b> 2A RN pump is running

Is D/G inoperable?  
 This would be the second D/G in op.  
 Could enter TS 30.3 →

Event 2

Loss of ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Checks B/O on 1ETA	No, go to step 22
	SRO	Dispatches operator to close: <ul style="list-style-type: none"> <li>• 1KC-228B</li> <li>• 1KC-18B</li> </ul>	
	SRO	Checks 1B ND train – was in RHR mode	No. Go to step 29
	SRO	Checks normal letdown – IN SERVICE	No, have BOP place letdown back in service per AP12.
	SRO	Will hand off to BOP AP-12 and direct him to place normal Letdown in service. And continue on in AP-7	
	RO	Check VCT make up Control system	
	RO	Announce occurrence on page	
	SRO	GO TO Step 37	
	SRO	Check if an SI has occurred during the event.	An SI has not occurred; the SRO will go to the RNO. He may ask the Unit 2 BOP to perform EP/1/A/5000/G-1 Encl. 13 or he may direct the Unit 1 RO to perform it. It is time critical to have the enclosure initiated within 30 minutes of the BO
	SRO	Have available licensed operator initiate Encl. 7	He may ask the Unit 2 BOP to perform Encl. 7 or he may direct the Unit 1 RO to perform it. It is time critical to have the enclosure initiated within 30 minutes of the BO
	RO	Checks D/G on bus that BO is on. If it is not known that bus is locked out the RO will be directed to attempt to start D/G.	
	SRO	Will go to step 42 per RNO step 40. Determine an S/I has not occurred and go to step 44	
	RO	Control CA flow	All CA will be off.
	RO	Place recirc valve for KC pumps to auto for A Train and to Close for B Train	

**Event 2: Placing Letdown in Service**

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	BOP	If a loss of charging through the Regenerative HX has occurred, Then ensure closed <ul style="list-style-type: none"> <li>• 1NV-458A</li> <li>• 1NV-457A</li> <li>• 1NV-35A</li> </ul>	
	BOP	Check PZR Level < 96%	
	BOP	If at any time "REGEN HX LETDN HI TEMP" alarms, close: <ul style="list-style-type: none"> <li>• 1NV-1A</li> <li>• 1NV-2A</li> </ul>	BOP will take action if appropriate
	RO	Stop any power or temperature changes in progress	
	RO	Announces occurrence on page	
	SRO	IF this AP entered due to loss of letdown only, then go to step 36.	SRO will go to step 36 in this AP
	BOP	Ensure Closed <ul style="list-style-type: none"> <li>• 1NV-457A</li> <li>• 1NV-458A</li> <li>• 1NV-35A</li> </ul>	
	BOP	Ensures "NC Sys M/U Controller" in AUTO	
	BOP	Ensures charging flow going down to maintain Pzr at program level	
	BOP	Checks "Letdn Relief Hi Temp" alarm has remained dark	
	BOP	Checks 1NV-21A – closed	
	BOP	Checks Pzr heater group supply breakers - closed	
	BOP	Checks normal PZR Spray available	
	BOP	Place A, B, and D PZR heater groups in manual and on	Maximizes spray flow
	BOP	Checks the following OPEN <ul style="list-style-type: none"> <li>• 1NV-1A</li> <li>• 1NV-2A</li> </ul>	
	SRO	Go to step 48	

**Event 2      Placing letdown in service**

	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	BOP	<p>Establish normal letdown:</p> <ul style="list-style-type: none"> <li>a. Ensure 1NV-459 is closed</li> <li>b. Place 1NV-124 in manual between 10-20% open.</li> <li>c. Check the following – OPEN               <ul style="list-style-type: none"> <li>• 1NV-1A</li> <li>• 1NV-2A.</li> </ul> </li> <li>d. Establish cooling from Regenerative HX by performing the following concurrently:               <ul style="list-style-type: none"> <li>• Establish at least 65 gpm charging by throttling open 1NV-238.</li> <li>• Throttle 1NV-241 to establish approximately 8 gpm seal injection flow</li> </ul> </li> <li>e. Open letdown line isolation valves:               <ul style="list-style-type: none"> <li>• 1NV-7B</li> <li>• 1NV-1A</li> <li>• 1NV-2A</li> <li>• 1NV-35A</li> </ul> </li> <li>f. Check normal letdown – ISOLATED LESS THAN 1 HOUR.</li> <li>g. Establish desired letdown flow rate by completing the following concurrently:               <ul style="list-style-type: none"> <li>• Slowly throttle open 1NV-459 to desired flow rate</li> <li>• As letdown pressure rises, adjust 1NV-124 to maintain letdown pressure between 250 PSIG and 350 PSIG.</li> </ul> </li> <li>h.. Do not continue until desired flow rate has been established.</li> </ul>	

Event 2

Placing letdown in service

Pos.	Expected Actions/ Behavior	Comments
	<p>i. Adjust charging flow as desired while maintaining:</p> <ul style="list-style-type: none"> <li>• NC pump seal injection flow greater than 6 gpm</li> <li>• Regenerative HX letdown temperature less than 380°F</li> <li>• Pzr level at program level.</li> </ul> <p>j. If desired to leave 1NV-459 in service then go to Step 48.m</p> <p>m. Return valves to normal as follows:</p> <ol style="list-style-type: none"> <li>1. ensure pot setting for 1NV-124 is set at approximately 5.8.</li> <li>2. manually adjust 1NV-124 to obtain as required to obtain letdown pressure of 350 psig.</li> <li>3. place 1NV-124 in "AUTO"</li> <li>4. ensure letdown pressure controlled at 350 psig.</li> <li>5. check 1NV-35A OPEN</li> </ol> <p>o. WHEN Pzr level matches program level, THEN perform the following:</p> <ol style="list-style-type: none"> <li>1. place "PZR LEVEL MASTER" in "MAN"</li> <li>2. place "PZR LEVEL MASTER" demand to approximately 45%</li> <li>3. place 1NV-239 in "AUTO"</li> <li>4. place "PZR LEVEL MASTER" in "AUTO"</li> <li>5. adjust 1NV-241 to maintain 8 gpm seal injection flow to each NC pump.</li> </ol> <p>r. Operate Pzr heaters as desired.</p> <p>u. Return to procedure and step in effect.</p>	
	<p>Tech Spec evaluation for inoperable NV pump. 3.5.2 and SLC 16.9.9</p>	

**Event 3: Steam Generator "1B" Level Channel 1 Failure LOW**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> <li>• A-2</li> <li>• C-2</li> </ul>	Per annunciator response and AP/06 the operator will swap failed channel to operable channel
	SRO	Enters AP/06 Loss of S/G Feedwater	
	RO	Places Feed Regulator to Manual Restores S/G level to program level	<i>Immediate Action</i>
	RO	Checks the following channel indicating the same: <ul style="list-style-type: none"> <li>• Feed flow</li> <li>• Steam Flow</li> <li>• S/G Level</li> </ul>	<i>Immediate Action</i>  Selects operable channel
	RO	Announce occurrence on page.	
	RO	Checks the reactor trip breakers closed > P-11	Yes
	RO	Monitor S/G NR Level	If at any time S/G NR Level approaches 17% or 83%, then trip Reactor
	RO	Check reactor power – GREATER THAN 3%	
	RO	Check CM/CF feeding S/G	
	RO	Check "FAILURE HOLD" light on both CF pumps - DARK	
	RO	S/G level stable or trending to program	
	BOP	Checks NC temperature with NC pumps on stable or trending to programmed temperature	
	RO	When the following are met then return affected S/G CF control to automatic <ol style="list-style-type: none"> <li>1. Selected control channels indicated correctly <ul style="list-style-type: none"> <li>• Feed flow</li> <li>• Steam flow</li> <li>• S/G level</li> </ul> </li> <li>2. Affected S/G level restored to program level</li> <li>3. Automatic control is desired</li> </ol>	

**Event 3: Steam Generator Level Channel Failure**

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	RO	Checks both CF pumps – IN AUTO	
	RO	Check all CA pumps - OFF	
	SRO	Contacts WCC to have WR written, have I&E investigate and repair failed channel and evaluate T.S..  Exit procedure	<b>Failure will not be repaired Tech Spec</b>
		<b>Tech Spec. 3.3.1, 3.3.2, 3.3.3, 3.4.5, 3.4.6, 3.4.7</b>	

**Event 4: Pressurizer Pressure Master Controller Failure**

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Annunciator PZR Lo Press Control will alarm	
	BOP	Actual pressure will be increasing – while demand is decreasing	
	SRO	Go to AP/11	
	BOP	Should take Pzr Pressure Master to Manual	
	BOP	Checks actual Pressurizer Pressure – HAS GONE DOWN	NO, go to step 17
	BOP	Checks Pzr pressure – GOING UP	
	BOP	Check all Pzr pressure channels – INDICATING THE SAME - YES	
	BOP	Checks the following Pzr heaters – OFF <ul style="list-style-type: none"> <li>• 1A</li> <li>• 1B</li> <li>• 1D</li> </ul>	
	BOP	Check 1C Pzr heaters – MAINTAINING NC PRESSURE AT DESIRED PRESSURE.	Place "Pzr Press Master" in manual. Control pressure
	RO	Announce occurrence on page.	
	BOP	Check Pzr Spray Valves - OPEN	
	BOP	Check Pzr pressure – GING DOWN TO DESIRED PRESSURE.	
	BOP	Ensure "PZR PRESS REC SELECT" is in operable channel.	

**Event 5: Decrease in System Frequency**

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	CREW	Notices decrease in frequency	
	SRO	GO TO AP-05	
	RO	Announce occurrence on page.	
	SRO	GO TO appropriate enclosure. Enclosure 2 Abnormal Frequency	
	SRO	Check Generator – TIED TO GRID	Crew should reduce load to maintain less than 100% power.
	SRO	Check Generator Frequency – GREATER THAN 58.5 Hz.	
	SRO	Monitor Generator frequency as follows: a. give Enclosure 3 to operator to continuously monitor frequency b. Keep track of accumulated time frequency is less than nor equal to each limit in table.	
	SRO	Ensures Unit 2 implements AP-05	
	SRO	WHEN notified by SOC that Grid is stable and reliable, THEN exit this procedure.	
	SRO	Do not continue unless a time limit in Step 4 table is reached.	

CREW	<p>Separate from the Grid as follows:</p> <ol style="list-style-type: none"> <li>a. Notify SOC that Unit 1 is separating from the grid.</li> <li>b. Check "TURB IMP PRESS CH 2" – GREATER THAN 340 PSIG.</li> <li>c. Check generator frequency – GREATER THAN 58.5 Hz.</li> <li>d. Ensure control rods in auto.</li> <li>e. Check Turbine automatic control – AVAILABLE.</li> <li>f. Ensure turbine control in "OPERATOR AUTO"</li> <li>g. Place "MW LOOP" in service</li> <li>h. Enter target load of 300 MW</li> <li>i. Enter load rate of 300MW/MIN</li> <li>j. Depress "GO"</li> <li>k. Do not continue until the following conditions are met: <ul style="list-style-type: none"> <li>• "TURB IMP PRESS CH 2" – LESS THAN 340 PSIG</li> <li>• P/R meters – LESS THAN 60%</li> </ul> </li> <li>l. Notify Unit 2 Operator that Unit 1 is separating from the Grid.</li> <li>m. Open the following switchyard PCBs: <ol style="list-style-type: none"> <li>1. PCB-8</li> <li>2. PCB-9</li> <li>3. PCB-11</li> <li>4. PCB-12</li> </ol> </li> </ol>	
SRO	Go to AP-03 Load rejection to stabilize the Unit and parallel back to the Grid.	

Event 6: AP-03 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enters AP-03 Load Rejection	Once AP-03 is entered turbine vibration will begin to increase.
	RO	Ensures Control Rods in Auto	<i>This is an immediate action step.</i>
	RO	Check Turbine Generator Tied to Grid and output going down.	NO a. Perform the following: 1. Ensure governor valves close to maintain turbine speed at 1800 RPM. 2. IF AT ANY TIME governor valves fail to control speed at 1800 RPM, THEN place turbine in manual and control speed at 1800 RPM. 3. TO TO Step 3.
	RO	Checks Control rods moving in as required & aligned with associated bank.	
	BOP	Checks proper CM system operation: • Standby Hotwell and Condensate Booster pumps RUNNING • 1CM-420 - OPEN	BOP Should start pumps and check manual loader OPEN
	RO	Ensures impulse pressure < 410 psig	
	RO	Announce occurrence on page.	
	RO	Check P/R meters less than 20%	No
	SRO	Designates an operator to continuously monitor reactor power and go to step 9.	
	RO	Checks condenser dump valves modulating open	
	RO	Checks load rejection – due to loss of CF pump	NO
		<b>At this time turbine vibration will be increasing and the SRO will have to decide to trip the turbine.</b>	

**Event 7: Loss of All AC Power**

	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO	Goes to E-0 or ECA 0.0	
	RO	Checks Reactor trip: <ul style="list-style-type: none"> <li>• All rod bottom lights LIT</li> <li>• Reactor trip and bypass breakers OPEN</li> <li>• I/R amps – Going Down</li> </ul>	
	RO	Checks turbine trip: <ul style="list-style-type: none"> <li>• All throttle valves closed</li> </ul>	
	BOP	Isolate letdown	
	SRO	Dispatch personnel as follows: <ol style="list-style-type: none"> <li>a. Dispatch operator to SSF to perform the following:               <ul style="list-style-type: none"> <li>• Obtain Brown Folder at SSF and complete Enclosure 1.</li> </ul> </li> <li>b. Dispatch operator to 1ETA room as follows:               <ol style="list-style-type: none"> <li>1) Check if operator will enter Aux Bldg – FROM BACK OF CONTROL ROOM</li> <li>2) Give operator dosimeter from Unit 2 BOP desk.</li> <li>3) Dispatch operator to perform Enclosure 2.</li> </ol> </li> <li>c. Notify security to dispatch and office to the SSF.</li> </ol>	

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Check NC System – ISOLATED. a. Check Pzr PORVs - ISOLATED b. Check letdown orifice isolation valves – CLOSED. • 1NV-458A • 1NV-457A • 1NV-35A c. Close: • 1NV-1A • 1NV-2A d. Check excess letdown isolation valves - CLOSED • 1NV-24B • 1NV-25A e. Check 1NV-121 - CLOSED	
	BOP	Check total CA flow – GREATER THAN 450 GPM.	Perform the following: a. If flow less than 450 gpm due to operator action to control CA flow THEN GO TO Step 8. b. Ensure TD CA pump on.

**Event 7: Loss of All AC Power**

	Pos.	Expected Actions/ Behavior	Comments
	SRO	Try to restore power to 1ETA or 1ETB: a. Place both trains D/G mode select switches to control room. b. Perform the following for any D/G(s) that are off: • Depress, then release "RESET" on sequencer. • Start D/G c. Check at least one D/G - RUNNING	c. Perform the following: • Initiate S/I • If at least one D/G starts, THEN GO TO Step 8.d • GO TO Step 9
	SRO	<ul style="list-style-type: none"> <li>• Refer to RP/000</li> <li>• Classification of Emergency</li> </ul>	
	RO	Control intact S/G levels: a. Check N/R level in any intact S/G – GREATER THAN 11% b. Check VI header pressure – GREATER THAN 60 PSIG. c. Throttle CA control valves to maintain all intact S/G N/R levels between 11% and 50%. d. Monitor CA Storage tank level e. Notify available operator to initiate G-1 Enclosure 13 within 30 minutes of loss power	
	SRO	Have Unit 2 perform Enclosure 6.	
	SRO	Check ND status: a. ND system – IN RHR MODE AT TIME OF LOSS OF POWER	GO TO Step 14.
	SRO	Check is S/I is actuated: a. "Safety Injection Actuated " status light - LIT b. Reset S/I	

**Event 7: Loss of All AC Power**

	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO	Defeat auto loading of 1ETA and 1ETB as follows: a. ensure NS reset. b. Ensure NS pump breakers are open. c. Dispatch operator to open breakers to sequencer control power. • A Tra – 1EVDA Breaker 6 • B Train – 1EVDD Breaker 8 d. Dispatch operator to remove control power fuses on Unit 1 NS pumps.	(MAL) EQB002A and 2B – INSERT  (LOA) NS005 and NS006 – Rack Out
	SRO	Check 4160V busses as follows: a. dispatch operator to 1ETA and 1ETB switchgear to check for lockout relays. b. IF AT ANY TIME dispatched operator determines that lockout exists, THEN • Have IAE clear or isolate fault from bus. • When fault cleared or isolated from bus, THEN reset lockout.	
	SRO	Restore power to 1ETA or 1ETB using any of the following while continuing with this procedure: • Local reset and start of D/G PER Enclosure 7. OR • Unit 1 offsite power PER Enclosure 8. OR • Unit 2 6900V busses through SATA or SATB PER Enclosure 9.	Clear D/G control power – (MAL) EPQ001A  (LOA) DG003 Start 1A D/G <i>TRIGGERED OUT</i>

**Event 7 Restoration of power through 1A D/G Enclosure 7**

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO	Perform one of the following: a. If 1ETA is to be energized with D/G, THEN GO TO Step 2.	
	SRO	Check "SEQ A LOSS OF CONTROL PWR" alarm - LIT	
	BOP	Check the following 4160V breakers – OPEN <ul style="list-style-type: none"> <li>• 1ETA Normal Breaker</li> <li>• 1ETA Standby Breaker</li> <li>• 1ETA Emergency Breaker</li> </ul>	Perform the following: a. Ensure 1A D/G Mode Select switch is selected to control room. b. Open breakers.
	BOP	Place 1A D/G Mode Select switch to local.	
	SRO	Dispatch operator to 1A D/G control panel to: a. Depress "EMERG RESET" b. Depress "START" on "DIESEL CONTROL"	
	BOP	Check 1A D/G – RUNNING.	
	SRO	Check if S/I is actuated: a. "SAFETY INJECTION ACTUATED" status light – LIT.	GO TO Step 8
	BOP	Unload 1ETA emergency bus as follows: a. Open 600V essential load center feeder breaker: <ul style="list-style-type: none"> <li>• 1ELXA</li> <li>• 1ELXC</li> <li>• 1ELXE</li> </ul> b. Open 1A CA pump breaker c. Open remaining pump breakers: <ul style="list-style-type: none"> <li>• 1A NV pump</li> <li>• 1A ND pump</li> <li>• 1A NI pump</li> <li>• 1A1 KC pump</li> <li>• 1A 2 KC pump</li> <li>• 1A RN pump</li> <li>• 1A KF pump</li> </ul>	

Pos.	Expected Actions/ Behavior	Comments
	d. Check Monitor Light Panel Group 4, window G-3 "A NS PUMP RUNNING" DARK	
BOP	Place 1A D/G Mode Select switch to control room	
BOP	Close 1ETA Emergency Breaker.	
BOP	Establish RN flow to D/G HX:	
	a. Close 600V essential feeder breaker 1ELXA	
	b. Ensure RN pump suction and discharge flowpath available.	
	c. Close 1RN-43A	
	d. Start 1A RN pump.	
	e. Ensure the following valves full open: <ul style="list-style-type: none"> <li>• 1RN-70A</li> <li>• 1RN-73A</li> </ul>	
SRO	Check 1ETA bus – ENERGIZED. GO TO Step 34 in body of procedure.	
SRO	Check S/G pressure – STABLE.	
BOP	Check the following status lights on 1SI-14 – DARK <ul style="list-style-type: none"> <li>• ELXA STD-BY BKR CLOSED</li> <li>• ELXB STD BY BKR CLOSED</li> <li>• ELXC STD BY BKR CLOSED</li> <li>• ELCD STD BY BRK CLOSED</li> </ul>	
SRO	Ensure loads place on essential bus in subsequent steps do not exceed capacity of the power source.	
BOP	Load the following equipment on energized AN emergency bus: <ul style="list-style-type: none"> <li>• ETA <ul style="list-style-type: none"> <li>a. 600 V busses <ul style="list-style-type: none"> <li>• 1ELXA</li> <li>• 1ELXC</li> </ul> </li> <li>b. Battery chargers: <ul style="list-style-type: none"> <li>• EVCA</li> <li>• EVCC</li> </ul> </li> </ul> </li> </ul>	
BOP	Check RN System operation: <ul style="list-style-type: none"> <li>a. Check proper valve alignment PER Enclosure 22.</li> <li>b. Check RN pumps - ON</li> </ul>	

**Event 7 Restoration of power**

	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	RO SRO	Check TD CA pump – ON. Select recovery procedure: a. Check standby makeup pump – ON. b. Check NC subcooling based on core exit T/Cs – GREATER THAN 0°F. c. Check Pzr level – GREATER THAN 11%. d. Check the following valves – CLOSED: • 1NI-9A • 1NI-10B e. GO TO ECA 0.2 Loss of All AC Power Recovery With S/I Required.	
Terminate Scenario when recovery procedure selected.			

**Note to Examiner: Be sure SRO classifies event at end of scenario.**

- 1) **Classification of Event: Site Area Emergency  
4.5.S.1-1**

**SHIFT TURNOVER INFORMATION**

**UNIT 1 STATUS:**

Power Level: 100%    NCS [B] 953 ppm    Pzr [B]: 953 ppm    Xe: 2895pcm

Power History: At this power since startup    Core Burnup: 250 EFPDs

**CONTROLLING PROCEDURE:** OP/1/A/6100/03 Controlling Procedure for Unit Operation

**OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:**

- "1A" Diesel Generator tagged for PM.
- "1A" Motor Driven Auxiliary Feedwater Pump tagged for oil sample.
- Unit 2 is available for Auxiliary Steam
- Reduce power to 86% for turbine valve movement test.

<b>Work Control SRO/Offsite Communicator</b>	<b>Tim</b>
<b>Plant SRO</b>	<b>Gary</b>

**NLO's AVAILABLE**

<u>Unit 1</u>	<u>Unit 2</u>
Aux Bldg. Ken	Aux Bldg. John
Turb Bldg. Al	Turb Bldg. Greg
5 <sup>th</sup> Rounds. Tom	
Extra(s) Richard, Fred	

Facility: McGuire

Scenario No.: Spare

Op-Test No.: \_\_\_\_\_

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

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

Initial Conditions: 40% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged

Turnover: Make Up to Cold Leg Accumulator

Event No.	Malf. No.	Event Type*	Event Description
1		N	(BOP) Make up level to Cold Leg Accumulator
2		I	(RO) Tref fails HIGH
3		C	(BOP) 1NV-238 Auto/Man station fails – Manual still available
4		C	(RO) "D" S/G PORV fails OPEN
5		I	(BOP) VCT Level instrument fails
6		C	(BOP) Feedwater Pump deltaP program fails both FWPTs back out of header
7		M	Loss of Heat Sink
			"B" Auxiliary Feedwater Pumps does not start
			TDCA pump trips
			TDCA pump trips
			No Auto SI
			Two rods fail to insert

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 22

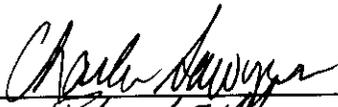
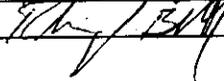
TOPIC: Nuclear Regulatory Commission Simulator Exam  
Scenario Spare

**REFERENCES:**

1. McGuire Technical Specifications
2. OP/1/A/4200/009M Make up to Cold Leg Accum.
3. AP/1/A/5500/14 Rod Control Malfunction
4. AP/1/A/5500/01 Steam Leak
5. AP/1/A/5500/06 Loss of S/G Feedwater
6. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
7. EP/1/A/5000/ES-0.1 Reactor Trip Response
8. EP/1/A/5000/H-1 Response to Loss of Secondary Heat Sink
9. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:

  
\_\_\_\_\_  
  
\_\_\_\_\_

Nov. 24, 2004  
Rev. 1

## EVENT SUMMARY

1. Make up to "D" CLA.
2. 1NV-124 failure.
3. 'D' S/G PORV Fails Open. Enter AP-1
4. VCT level instrument failure
5. Feedwater pump failure. Enter AP-03
6. S/G Levels going down requires Rx. Trip and SI. Enter E-0 then H-1.

### SIMULATOR OPERATOR INSTRUCTIONS

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>	Sim. Setup	<b>Rod Step On</b>	
<input type="checkbox"/>		<b>IC - 136</b>	
<input type="checkbox"/>		<b>RUN</b>	
<input type="checkbox"/>		<b>Update</b> Status Board, <b>Setup OAC</b> <b>Setup ICCM, Turbine Displays, &amp; Trend Recorders.</b> <b>Check Rod Step Counters agree with rod positions</b>	See Shift Turnover Information
<input type="checkbox"/>		<b>(M) EPQ001A</b> <b>Set = 1</b>	Loss of D/G "1A" Control Power
<input type="checkbox"/>		<b>(LOA) CA009</b> <b>Set = F</b> <b>(MAL) CA005</b> <b>(MAL) CA004B</b>	Rack out breaker for "1A" Auxiliary Feedwater Pump  TD CA pump trips 'B' CA pump will not start
<input type="checkbox"/>		<b>(MAL) IRE010B</b> <b>(MAL) IRE010H12</b>	Rods H8 and H12 fail to insert into the core
<input type="checkbox"/>		<b>(MAL) ISE007A</b> <b>(MAL) ISE007B</b>	Blocks automatic actuation of feedwater isolation
<input type="checkbox"/>		<b>(MAL) DEH003A</b>	Blocks automatic turbine trip

	<b>Bench Mark</b>	<b>ACTIVITY</b>	<b>DESCRIPTION</b>
<input type="checkbox"/>		<b>Freeze.</b>	
<input type="checkbox"/>		<b>Update Fresh Tech. Spec. Log.</b>	
<input type="checkbox"/>		<b>Fill out the NLO's Available section of Shift Turnover Info.</b>	
<input type="checkbox"/>	Prior to Crew Briefing	<b>RUN</b>	
<input type="checkbox"/>	<b>Crew Briefing</b>		
	<ol style="list-style-type: none"> <li>1. Assign Crew Positions based on evaluation requirements</li> <li>2. Review the Shift Turnover Information with the crew.</li> <li>3. Direct the crew to Review the Control Boards taking note of present conditions, alarms.</li> </ol>		
<input type="checkbox"/>	T-0	Begin Familiarization Period	
<input type="checkbox"/>	At direction of examiner	<b>(XMT) NV044</b> <b>Set = 0</b> <b>Ramp = 60</b> <b>Trigger 1</b>	Manual/auto Station for 1NV-124 fails
<input type="checkbox"/>	At direction of examiner	<b>(MAL) IR001</b> <b>Set = 585</b> <b>Trigger 2</b>	Tref fails to 585 and rods will withdraw
<input type="checkbox"/>	At direction of examiner	<b>(MAL) SM001D</b> <b>Set = 100</b> <b>Trigger 3</b>	Fails Open 'D' S/G PORV to 100%
	At direction of examiner	<b>(XMT) NV001</b> <b>Set = 100</b> <b>Trigger 4</b>	Fails VCT level transmitter to 100%
<input type="checkbox"/>	At direction of examiner	<b>(MAL) IWE002B</b> <b>(OVR) IWE0019C</b> <b>(MAL) LF003B</b> <b>Trigger 5</b>	Backs out 'B' FWPT, then three minutes later the 'B' FWPT trips.
<input type="checkbox"/>		<b>(MAL) LF003B</b>	<b>Trip 'B' FWPT three minutes after reactor trip</b>
	<b>Terminate the scenario upon direction of Chief Examiner</b>		

**EVENT 1:** Normal Operations CLA makeup

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Evaluate PRA Risk interactions	Cue: PRA Risk Assessment has been performed and is SAT.
	SRO	Declare 1A NI pump inoperable.	
	RO BOP	Close 1NI-118a	
	RO BOP	Ensure open: 1NI-100B, 1NI-147A, and 1NI-115B	
	BOP	Start 1A NI pump	
	BOP	Check Recirc. flow 1FWP-5250	
	BOP	Open 1NI-120B	
	BOP	Open 1NI-90 to fill 1D CLA	
	BOP	Close 1NI-90 once desired level obtained	
	BOP	Close 1NI-120	
	BOP	Stop 1A NI pump	
	BOP	Dispatch NLO to 1NIPG6150 to monitor pressure decreasing to < 60psig	Pressure reading 50psig.
	RO BOP	Open 1NI-118A	
	SRO	Declare 1A NI pump operable.	
	BOP	If high pressure alarm comes in, adjust pressure per Enclosure 4.3	

**EVENT 2:** 1NV-124 Manual/Auto Station fails, valve closes

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Notices increase in letdown pressure	OAC and annunciator alarms Letdown HX Outlet Hi Press
	BOP	Place 1NV-124 in manual and adjust letdown pressure to normal	
	SRO	Notify WCC or IAE to investigate failure of Auto portion of 1NV-238.	

Event 3: Tref failure High

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes control rod movement.	
	SRO	Enters AP/14	
	RO	Checks if more than 1 rod dropped	<i>Immediate Actions</i> No dropped rods..
<b>*</b> <b>Critical</b>	RO	Place control rods in manual and check rod movement stopped	<i>Immediate Actions</i> Rod movement stopped.
	RO	Check all rods aligned with associated bank.	All rods correctly aligned.
	RO	Check "rod control urgent failure alarm" dark.	yes
	RO	Check the following normal <ul style="list-style-type: none"> <li>• Turb. Imp. Pressure Ch.1</li> <li>• T-Ref indication</li> </ul> All 4 NC loop Taves	No, T-Ref has failed hi
	SRO	Determines Enclosure 4 correct.	Go to enclosure 4. Announce occurrence on paging system.
	SRO	Evaluate prior to any control rod withdrawal <ul style="list-style-type: none"> <li>• No mode change will occur</li> <li>• Control rods withdrawn in conservative manner.</li> </ul>	
	RO	Check the following normal <ul style="list-style-type: none"> <li>• Turb. Imp. Pressure Ch.1</li> <li>• T-Ref indication</li> </ul>	No,T-Ref has failed hi.
	SRO	Notify IAE to repair failed indication	Notifies qualified IAE. Informs operators to maintain T-Colds 555-557 F. By manual rod movement, adjusting turbine load or Borate/dilute NC system.

**EVENT 4: 1D S/G PORV Fails Open**

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes symptoms of a steam leak. Reactor power increasing, Tave decreasing.	
	SRO	Implements AP/01 Steam Leak	
	CREW	Monitors foldout page.	
	RO	Reduce turbine load to maintain the following: <ul style="list-style-type: none"> <li>• Excore NI's – LESS THAN OR EQUAL TO 100%</li> <li>• NC Loop D/Ts – LESS THAN 60°F D/T</li> <li>• T-ave – AT T-REF</li> </ul>	
	SRO	Check containment entry – IN PROGRESS	NO, go to step 5
	SRO	Check Pzr pressure prior to event – GREATER THAN P-11	
	RO	Check Pzr level – STABLE OR GOING UP	If level is going down. Perform the following as required to maintain level: <ol style="list-style-type: none"> <li>a. Maintain charging flow less than 200 GPM at all times in subsequent steps.</li> <li>b. Ensure 1NV-238 opening</li> <li>c. Open 1NV-241 while maintaining NC pump seal flow greater than 6 GPM.</li> <li>d. Reduce or isolate letdown.</li> <li>e. Start additional NV pump.</li> <li>f. If Pzr level is going down with maximum charging flow, THEN GO TO STEP 9.</li> </ol>
	CREW	IF AT ANY TIME while in this procedure PZR level can not be maintained stable, THEN RETURN TO Step 6.	
	SRO	GO TO Step 12.	
	RO	Announce occurrence on paging system.	

	CREW	Identify and isolate leak on Unit 1. a. Check S/G PORVs - CLOSED b. Check condenser dump valves – CLOSED c. Check the following – NORMAL <ul style="list-style-type: none"> <li>• Containment temperature</li> <li>• Containment pressure</li> <li>• Containment humidity</li> <li>• Containment floor and equipment sump level</li> <li>• Check TD CA Pump – OFF</li> <li>• Check valves on “STEAM LINE DRAIN VALVES” board – CLOSED</li> <li>• Check opposite Unit “STEAM HEADER PRESSURE – GREATER THAN 200 PSIG.</li> <li>• Dispatch operator to check for leaks.</li> </ul>	a. Perform as necessary to isolate: <ul style="list-style-type: none"> <li>• Close 1D PORV manual loader</li> <li>• Close PORV isolation valve</li> <li>• Dispatch operator to close S/G PORV isolation valve</li> </ul>
	BOP	Check UST level – STABLE OR GOING UP	
	SRO	Evaluate unit shutdown as follows: a. Check Unit status – MODE 1 or 2 b. Determine if unit shutdown or load reduction is needed. c. Check unit shutdown or load reduction – REQUIRED. d. Check reactor trip required. e. Determine if turbine trip is desired	Go to step 16
	SRO	Check MSIVs – CLOSED.	Go to step 18
	SRO	Exit procedure.	
		Tech Spec 3.7.4 for tracking only	

**EVENT 5: VCT Level Transmitter fails High**

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Notice a change in VCT level on Trend	"VCT ABNORMAL LEVEL" Annunciator will alarm
	BOP	Identifies either or both: Level transmitter high/ 1NV-137 diverting to HUT	
	SRO	Directs BOP to position 1NV-137 to VCT position	
		Crew should refer to annunciator response procedure.	

Event 6: Loss of both Feed Pumps.

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Per symptoms decide to enter AP-06 (Both CF pumps backing out of header)	
	SRO	Enters AP/06 Loss of S/G Feedwater	
	RO	Places CF pumps to Manual Attempts to restore CF pump speed	
	RO BOP_	If CF or bypass valve has failed....	<i>Immediate Action</i> No,
	RO BOP	Checks the following channel indicating the same: <ul style="list-style-type: none"> <li>• Feed flow</li> <li>• Steam Flow</li> <li>• S/G Level</li> </ul>	<i>Immediate Action</i> Yes all indicating the same  <b>Should announce occurrence on page</b>
	RO	Checks the reactor trip breakers closed > P-11	Yes
	RO	Monitor S/G NR Level  Check Reactor power > 3%	If at any time S/G NR Level approaches 17% or 83%, then trip Reactor  Yes
	BOP	Check CM/CF feeding S/G  If CF pumps incapable of feeding S/Gs and reactor power > 3%	No, RO attempts to increase CF pump speed.  Yes
	SRO	Trip reactor, Go to E-0	

**EVENT 7**      E-0 Reactor Trip/ Safety Injection

<b>Time</b>	<b>Pos.</b>	<b>Expected Actions/ Behavior</b>	<b>Comments</b>
	SRO	Enters E-0	
	Crew	Monitors Foldout page	
	RO	Check Reactor Trip: <ul style="list-style-type: none"> <li>• rod bottom lights</li> <li>• reactor trip breakers open</li> <li>• I/R amps decreasing</li> </ul>	<i>Immediate Action</i> "A" Rx. Trip breaker not open
	RO	Check Turbine Generator tripped <ul style="list-style-type: none"> <li>• TV's closed</li> </ul>	<i>Immediate action</i>
	BOP	Check ETA and ETB energized	<i>Immediate action</i>
	RO	Check SI status light - LIT	<i>Immediate action</i> No, SI not required.
	SRO	Implement F-0, and GO TO ES-0.1	<i>Immediate action</i>

ES-0.1 may be entered for a short time but a Red Path on Heat Sink will send crew to H-1.

Event 8

Loss of Heat Sink H-1

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	<ul style="list-style-type: none"> <li>• Goes to H-1</li> </ul>	
	CREW	<ul style="list-style-type: none"> <li>• Determines Feed flow &lt; 450gpm not due to operator action</li> </ul>	
	SRO	Checks to see if heat sink is required: <ul style="list-style-type: none"> <li>• NC Pressure &gt; greater than any non-faulted S/G pressure</li> <li>Any NC T-hot – greater than 350 degrees</li> </ul>	Yes
	Crew	Monitor foldout page	
	SRO	Check at least one of the following NV pumps – AVAILABLE <ul style="list-style-type: none"> <li>• 1A NV Pump</li> <li>OR</li> <li>• 1B NV Pump</li> </ul>	
	RO	Check if NC system feed and bleed should be initiated: <ol style="list-style-type: none"> <li>Check W/R level in at least 3 S/Gs LESS THAN 24%</li> <li>GO TO Step 20</li> </ol>	a. Perform the following: <ol style="list-style-type: none"> <li>Monitor feed and bleed criteria</li> <li>When satisfied go to step 20</li> <li>GO TO Step 6</li> </ol>
	SRO	Ensure S/G BB and NM valves closed per Enclosure 3.	
	RO	Attempt to establish CA flow to at least one S/G as follows: <ol style="list-style-type: none"> <li>Check power to both motor driven CA pumps - AVAILABLE</li> <li>Ensure control room valves aligned per Enclosure 4.</li> <li>Start all available CA pumps.</li> <li>Check TD CA pump – RUNNING</li> <li>Check total CA flow to S/Gs – GREATER THAN 450 GPM.</li> </ol>	GO TO Step 8.
	RO	Check steam dumps. <ol style="list-style-type: none"> <li>“STEAM DUMP SELECT” IN T-AVE MODE</li> <li>Perform the following to place steam dumps in steam pressure mode.                             <ol style="list-style-type: none"> <li>Ensure “STM PRESS CONTROLLER” setpoint at 1092 psig.</li> <li>Place “STM PRESS CONTROLLER” in manual</li> <li>Adjust “STM PRESS CONTROLLER” output to equal “STEAM DUMP DEMAND” signal.</li> </ol> </li> </ol>	

Time	Pos.	Expected Actions/ Behavior	Comments
		4. Place 'STM DUMP SELECT" in steam pressure mode. 5. Place "STM PRESS CONTROLLER" in auto.	
	BOP	Stop all NC pumps.	
	RO	Reset feedwater isolation as follows: a. Check the following alarms – DARK: • 1AD-5, G-6 • 1AD-5, H-6 b. Dispatch operator to block feedwater isolation signal per Enclosure 6. c. Check S/I – HAS BEEN ACTUATED d. Reset the following: 1. S/G 2. Sequencers e. IF AT ANY TIME a B/O signal occurs, THEN restart S/I equipment previously on. f. Do not continue until Enclosure 6 is completed.	
	BOP	Check CM System in service: • Hotwell pumps(s) – ON • Condensate Booster Pumps - ON	
	RO	Check CF pumps – AT LEAST ONE AVAILABLE TO START.	
	SRO	Establish CF flow per Enclosure 7.	

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Place the following in manual and close manual loaders <ul style="list-style-type: none"> <li>• S/G CF control valves</li> <li>• S/G Cf control bypass valves</li> </ul>	
	RO	Depress and release the Feedwater Isolation reset pushbuttons.	
	SRO	Check any CF pump - RESET	NO, go to step 14.
	RO	Depress "RESET" on "A OR B CF PUMP RECIRC VALVE CLOSURE CIRCUIT" and check "RESET" light lit.	
	RO	Perform the following on CF pump to be started: <ol style="list-style-type: none"> <li>a. Check if 1A CF pump – TO BE STARTED</li> <li>b. Perform the following on 1A CF pump. <ol style="list-style-type: none"> <li>1. Reset the hold mode using "HOLD RESET" toggle switch.</li> <li>2. Check the following hold lights dark. <ul style="list-style-type: none"> <li>• Rollback Hold</li> <li>• Failure Hold</li> </ul> </li> <li>3. Select "3" on "A CF PUMP STARTUP RATE"</li> <li>4. Depress lower on "A CF PUMP TURBINE GV POSITIONER" to lower "% STARTUP" as required to obtain the following. <ul style="list-style-type: none"> <li>• "% STARTUP APPROXIMATELY ZERO.</li> <li>• "MIN" light on "A CF PUMP TURBINE GV POSITIONER" – LIT.</li> </ul> </li> </ol> </li> </ol>	
	SRO	GO TO Step 16.	
	RO	Reset CF pump turbine to be placed in service by depressing "RESET" and holding "RESET" 2-3 seconds after "RESET" light is lit.	
	RO	Check AS pressure as follows: <ol style="list-style-type: none"> <li>a. Check AS header pressure – GREATER THAN 100 PSIG.</li> <li>b. When time allows, then realign AS per Steps 17.d through 17.g.</li> <li>c. GO TO Step 18.</li> </ol>	

**EVENT 8      Loss of Heat Sink**

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Check 1HM-95 - OPEN	
	RO	Close the following: <ul style="list-style-type: none"> <li>• 1CF-35AB</li> <li>• 1CF-30AB</li> <li>• 1CF-28AB</li> <li>• 1CF-26AB</li> </ul>	
	RO	Check 1A CF pump to be placed in service.	
	RO	Place 1A CF pump in service as follows: <ol style="list-style-type: none"> <li>a. Check 1A Cf pump RESET - YES</li> <li>b. Using the "A CF PUMP TURBINE SPEED" controller in manual, adjust "% FEEDWATER" indication to approximately 25%.</li> <li>c. Check "STARTUP I.S." light – LIT.</li> <li>d. Open stop valves by depressing "RAISE" on "A CF PUMP TURBINE HP-LP-SV" until "MAX" light lit on:               <ul style="list-style-type: none"> <li>• 1SP-15</li> <li>• 1HM-157</li> </ul> </li> <li>e. Select desired rate 1, 2, or 3 on "A CF PUMP STARTUP RATE".</li> <li>f. Using "A CF PUMP TURBINE GV POSITIONER", slowly accelerate 1A CF pump until:               <ol style="list-style-type: none"> <li>1. "FEEDWATER I.S." light is lit.</li> <li>2. Continue to raise "% STARTUP" to approximately 100%.</li> </ol> </li> <li>g. Using the "A CF PUMP TURBINE SPEED" controller in manual to maintain CF header pressure less than 1335 PSIG but high enough to feed the S/Gs.</li> </ol>	
	SRO	Check feed and bleed – ESTABLISHED IN BODY OF THIS PROCEDURE.	No, GO TO Step 27.

**Event 8      Loss of Heat Sink H-1**

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Establish feed flow to desired S/G(s) as follows: a. Open the following valve(s) for the S/G(s) to be fed. <ul style="list-style-type: none"> <li>• 1CF-126B</li> <li>• 1CF-127B</li> <li>• 1CF-128B</li> <li>• 1CF-129B</li> </ul> b. Throttle open S/G CF control bypass valve for S/G(s) to be fed.	
	SRO	Check Step 25 or 26 in this enclosure - IMPLEMENTED	a. WHEN S/G N/R level is greater than 11%, THEN control CF flow to maintain N/R level between 11% and 50%  b. RETURN TO step in effect in body of this procedure.
Terminate Scenario when flow established to S/Gs			

**Note to Examiner: Be sure SRO classifies event at end of scenario.**

**SHIFT TURNOVER INFORMATION**

**UNIT 1 STATUS:**

Power Level: 42% NCS [B] 1441 ppm Pzr [B]: 1441 ppm Xe: Per OAC  
Power History: At this power since startup Core Burnup: 250 EFPDs

**CONTROLLING PROCEDURE:** OP/1/A/6100/03 Controlling Procedure for Unit Operation Enclosure 4.1  
Step 3.18.18

**OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:**

"1A" Diesel Generator tagged for PM.  
"1A" Motor Driven Auxiliary Feedwater Pump is white tagged for oil sample.  
Unit 2 is available for Auxiliary Steam  
Level in CLA "1D" has been going down for several days. Make up to cold leg accumulator 1D is now required.  
"A" FWPT is not reset per procedure.  
Water is in the make up line.  
Thunderstorms are in the area.

**Work Control SRO/Offsite Communicator** Tim  
**Plant SRO** Gary

**NLO's AVAILABLE**

Unit 1

Aux Bldg. Ken

Turb Bldg. Al

5<sup>th</sup> Rounds. Tom

Extra(s) Richard, Fred

Unit 2

Aux Bldg. John

Turb Bldg. Greg