

Draft Submittal

**MCGUIRE JUNE 2003 EXAM
50-369/2003-301 AND
50-370/2003-301**

JUNE 16 - 30, 2003

1. **Operating Test Simulator Scenarios**

NRC EXAM

2003

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, thunderstorms are in the area

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		C	(BOP) 1NV-137 Fails to Hold UP Tank (ARP)
3		I	(RO) S/G 'B' Steam Pressure Channel 1 Fails
4		C	(BOP) ETB Blackout due to Ground Fault
5		N	(BOP) Establish Normal Letdown
6		C	(RO) '1B' FWPT Trips and Runback to 50%
7		M	ATWS/Loss of Heat Sink
			Second FWPT trips after crew settles out in AOP.
			No Auto SI, Failure of Auto Turbine Trip
			TD CA pumps trips on overspeed
			Failure of turbine to runback automatically

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 21

TOPIC: Nuclear Regulatory Commission Simulator Exam

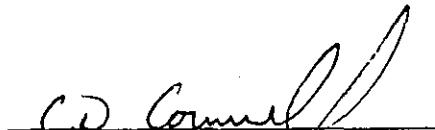
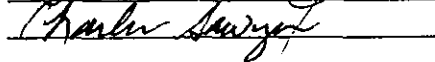
Scenario 1

REFERENCES:

1. McGuire Technical Specifications
2. PT/1/B/4250/028 Main Turbine Bearing Oil Pump Test
3. AP/1/A/5500/03 Load Rejection
4. AP/1/A/5500/06 Loss of S/G Feedwater
5. AP/1/A/5500/07 Loss of Electrical Power
6. AP/1/A/5500/12 Loss of Letdown, Charging or Seal Injection
7. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
8. EP/1/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS
9. EP/1/A/5000/FR-H.1 Response to Loss of Secondary Heat Sink
10. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:

April 3, 2003
Rev.1

EVENT SUMMARY

1. Main Turbine Bearing Oil Pump Test.
2. 1NV-137 fails to HUT.
3. S/G B Channel 1 Steam Pressure fails High. Enter AP-6
4. 1ETB B/O. Ground fault on bus. Enter AP-7
5. Place Normal Letdown in service, per AP-12
6. Load Rejection due to trip of 1B FWPT with a failure of the Turbine to runback. Enter AP-03
7. ATWS. Failure of Auto & Manual Rx trips, failure of Auto turbine trip on loss of 2nd FWPT. Enter E-0 and transition to FR-S.1.
8. Loss of Heat Sink. "A" MDCA tagged in Initial Conditions, "B" MDCA unavailable due to BO on 1ETB and TDCA trips on over speed when started. Enter FR-H.1

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC - 130	
<input type="checkbox"/>		RUN	
<input type="checkbox"/>		Update Status Board, Setup OAC Setup ICCM, Turbine Displays, & Trend Recorders. Check Rod Step Counters agree with rod positions	See Shift Turnover Information
<input type="checkbox"/>		(M) EPQ001A Set = 1	Loss of D/G "1A" Control Power
<input type="checkbox"/>		(LOA) CA009 Set = F	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		(M) IPE001A (M) IPE001B (M) IPE002A (M) IPE002B	Defeats automatic and manual reactor trips
<input type="checkbox"/>		(M) DEH002B6 (M) DEH003A	Blocks all turbine runbacks Failure of Auto Turbine tripped blocked

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>		(M) CA005	Turbine Driven AFW pump trips on over speed
<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"/>	Crew Briefing 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) NV070D Select: ON	1NV-137 to HUT
<input type="checkbox"/>	At direction of examiner	(XMT) SM016 Ramp = 10 Set = 1300, insert	Fails S/G "B" Steam Pressure Channel 1 HIGH
<input type="checkbox"/>	At direction of examiner	(M)EP008B Insert	Loss of 1ETB due to ground Fault
<input type="checkbox"/>		(M) KC008C Set = 0, insert (M) KC007D Set = 0, insert	Allow manual closing of 1KC18B and 1KC-228B

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	(M) LF002B Set = 100, insert (M) LF003B	Initiates a oil leak on 1B FWPT Trips the "1B" FWPT if necessary – Initiates an turbine runback – RO must manually runback the turbine
<input type="checkbox"/>	At direction of examiner	(M) IWE002A Set - 125 (M) LF003A	Speeds up "A" FWPT Trips the "A" FWPT and initiates an ATWS
<input type="checkbox"/>		(MAL) IPE001A (MAL) IPE001B	Delete – Opens reactor trip breaker 30 seconds after request by operator
		(MAL) ISE007A Block Both (MAL) ISE007B Block Both	Allows feedwater to be reset in H-1
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

EVENT 1: Normal Operations – PT/1/B/4250/028 Main Turbine Bearing Oil Pump Test

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO RO	Determine if Prerequisite System Conditions and required Unit Status are met.	Maintenance will not need to take vibration readings during PT.
	SRO RO	Perform section of PT Testing Oil Pumps with Turbine on Line	
	RO	Start "Brg Oil Pump/GSOB Pump	
	RO	Stop and ensure in auto Brg Oil Pump/GSOP Pump	
	RO	Start Emerg Brg Oil Pump	
	RO	Stop and ensure in Auto Emerg Brg Oil Pump	
	RO SRO	Verify Acceptance Criteria met.	

Event 2: 1NV-137 Fails to HUT position

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes 1NV-137 failing to HUT	
	SRO	Directs BOP to Place 1NV-137 in VCT position	
	SRO	Direct WCC to have WR written and have I&E investigate and repair.	

Event 3: Steam Generator "1B" Steam Pressure Channel 1 Failure HIGH

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> A-2 C-2 	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"> Feed flow Steam Flow S/G Level 	<i>Immediate Action</i> Selects operable channel
	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	
	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"> Selected control channels indicated correctly <ul style="list-style-type: none"> Feed flow Steam flow S/G level Affected S/G level restored to program level Automatic control is desired 	
	RO	Checks proper CF alignment	
	SRO	Contacts WCC to have WR written, have I&E investigate and repair failed channel and evaluate T.S.. Exit procedure	Failure will not be repaired 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
		At this time 1ETB blacks out	

Event 4: B/O 1ETB Ground Fault

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes loss of operating train "ETB"	
	SRO	Enters AP/07 Case 2	
	BOP	Checks bus energized and sequencer applying loads	<i>Immediate Actions</i> The D/G will not start due to a ground fault on 1ETB.
	BOP	If both NV pumps off, Then isolate NORMAL letdown. Start opposite train: <ul style="list-style-type: none"> • NV pump • KC pump • RN pump Go to step 3	<i>Immediate Actions</i>
	BOP	Verifies NO Safety Injection has occurred If both NV pumps off then isolate: <ul style="list-style-type: none"> • Excess letdown • ND letdown 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"> • Places 1KC-51A to AUTO • Ensures the following are open <ol style="list-style-type: none"> 1. 1KC-3A 2. 1KC-230A 3. 1KC-394A 4. 1KC-345A 5. If needed keep thermal barrier valves open raise KC flow to KF Hx by opening 1KC-149 • Ensures KC flow is less than 4000 gpm per operating KC pump 	
	BOP	Checks any charging pump – Running - YES	
	BOP	Align RN as follows: <ul style="list-style-type: none"> • Check 1A RN pump – Running – YES • Ensure 1RN-86A is open • Close 1RN-43A • Throttle 1RN-89A to desired cooling 	
	SRO	Notifies Unit 2 RO to start 2A RN pump	EXAMINER CUE: 2A RN pump is running

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"> • 1KC-228B • 1KC-18B 	
	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	BOP will place letdown back in service per AP-12.
	RO	Check VCT make up Control system	
	RO	Announce occurrence on page	
	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	
	SRO	Will continue through AP-7	

Event 5: Placing Letdown in Service

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	If a loss of charging through the Regenerative HX has occurred, Then ensure closed <ul style="list-style-type: none"> • 1NV-458A • 1NV-457A • 1NV-35A 	No
	BOP	Check PZR Level < 96%	
	BOP	If at any time "REGEN HX LETDN HI TEMP" alarms, close: <ul style="list-style-type: none"> • 1NV-1A • 1NV-2A 	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"> • 1NV-457A • 1NV-458A • 1NV-35A 	
	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"> • 1NV-1A • 1NV-2A 	
	SRO	Go to step 48	

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Establish normal Letdown <ul style="list-style-type: none"> • Ensure 1NV-459 closed • Place 1NV-124 in manual and 10 to 20% open • Check 1NV-1A and 1NV-2A open • Establish Regenerative Hx cooling by throttling 1NV-28 to establish 65 gpm charging flow and throttling 1NV-241 to establish 8 gpm seal flow • Open 1NV-7B, 1NV-1A, 1NV-2A & 1NV-35A • Letdown isolated < 1 hour • Throttle open 1NV-459 to establish letdown flow • Adjust 1NV-124 to maintain Letdown pressure between 250 & 350 psig • Adjust charging flow while maintaining seal flow > 6 gpm, Regenerative Hx temp. 380 degrees and PZR level at program. • Place 1NV-124 in auto 	1NV-7B will not have power. Position will be determined using OAC
	BOP	When PZR level matches program level <ul style="list-style-type: none"> • Place 1NV-238 to auto • Adjust seal flow to 8 gpm 	
	SRO	Notify Chemistry normal letdown is in service	
	BOP	Check 1NV-127 aligned to Demin	Select Demin if required
	BOP	Operate PZR heaters as required	
	SRO	When time allows notify Engineering to document transients	
	SRO	Return to procedure and step in effect	AP-7 Step 29
		At this time an oil leak develops on 1B FWPT	

Event 6: Trip of 1B FWPT due to oil leak – Failure of Turbine to Runback

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes oil leak on 1B FWPT	CUE: NLO at FWPT reports oil is spraying everywhere
	SRO	May decide to reduce load per AP-4 in an attempt to get power low enough to secure the FWPT, or he may decide to trip the FWPT and go to AP-3	If crew does not trip the 1B FWPT then it will be tripped to get them in a runback
	CREW	Recognizes trip of 1B FWPT and Load Rejection	
	SRO	Enters AP-03 Load Rejection	
	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.	RO will take Turbine to manual and reduce impulse pressure to 400-410 psig in fast action
	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 decreasing to < 410 psig	
	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	
		At this time 1A FWPT will trip and initiate an ATWS	

Event 7: ATWS with a loss of Heat Sink

	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes ATWS	
	SRO	Goes to E-0	
	RO	Checks Reactor trip: <ul style="list-style-type: none"> • All rod bottom lights LIT • Reactor trip and bypass breakers OPEN • I/R amps – Going Down 	RO should attempt to trip reactor using switches and will realize the turbine has not tripped and should trip the turbine.
	SRO	Recognizes reactor did not trip and implements F-0 and goes to FR-S.1	
Critical	RO	Checks Reactor trip: <ul style="list-style-type: none"> • All rod bottom lights LIT • Reactor trip and bypass breakers OPEN I/R amps – Going Down 	Manually inserts rods
	RO	Checks turbine trip: <ul style="list-style-type: none"> • All throttle valves closed • All governor valves closed 	Manually trips turbine if not already done.
	Crew	Monitors fold out page	
	BOP	Checks proper CA pump status: <ul style="list-style-type: none"> • MD CA pumps – ON • Check N/R level in at least 3 S/Gs greater than 17% 	1A Tagged out 1B no power 1ETB deenergized TD CA tripped on over speed
	BOP	Initiates emergency boration of NC system: <ul style="list-style-type: none"> • Ensures one NV pumps ON • Opens 1NV-265B • Starts both boric acid transfer pumps • Checks emergency boration flow > 30 gpm • Checks 1NV-244A and 1NV-245B OPEN • Checks Pzr pressure < 2335 psig 	1NV-265B no power Will have to align NV pump suction to the FWST 1NV-245B position will be verified using OAC
	BOP	Close 1VQ-1A, 1VQ-6A, 1VQ-2B & 1VQ-5B	

	Pos.	Expected Actions/ Behavior	Comments
	SRO	If an S/I signal exists or occurs perform Encl. 3	
	SRO	Checks the following trips have occurred: <ul style="list-style-type: none"> • Reactor trip • Turbine trip 	Dispatches operator to open: <ul style="list-style-type: none"> • Reactor trip breakers • Reactor trip bypass breakers • M/G Set Generator Breakers • M/G set Motor Breakers
	RO	Controls S/G levels: <ul style="list-style-type: none"> • Checks NR level in at least one S/G > 11% • Checks VI header pressure > 60 psig • Throttles feed flow to maintain S/G NR level between 11% and 50% 	If CA flow is less than 700 gpm, then start pumps and align valves as required. Maintain total CA flow greater than 700 gpm until at least on S/G NR level greater than 11%
	BOP	Checks all dilution paths ISOLATED <ul style="list-style-type: none"> • Places NC System M/U controller to OFF • Places Reactor Makeup water pumps to STOP 	
	RO	Checks steam lines intact: <ul style="list-style-type: none"> • All S/G pressures – Stable or Going UP • All S/G pressurized 	If any S/G depressurized or pressure going down in an uncontrolled manner ensure the following closed: <ul style="list-style-type: none"> • All MSIVs • All MSIV bypass valves
	BOP	Checks NC T-colds – Stable or Going UP	
	RO	Checks Core Exit T/Cs < 1200 degrees	
	SRO	Checks the reactor subcritical: <ul style="list-style-type: none"> • P/R channels < 5% • I/R SUR – NEGATIVE • W/R Neutron Flux < 5% 	Yes
	SRO	Calls chemistry to obtain current boron concentration	
	SRO	Refers to RP/000 Classification of Emergency	
	SRO	Return to procedure and step in effect.	Due to RED Path on Heat Sink goes to H-1.
	SRO	Goes to FR-H.1	
	Crew	Determines feed flow is less than 450 gpm but not due to operator action	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Checks to see if heat sink is required: <ul style="list-style-type: none"> • NC Pressure > greater than any non-faulted S/G pressure • Any NC T-hot – greater than 350 degrees 	Yes
	Crew	Monitor foldout page	At this point in the scenario Feed and Bleed criteria may be met.
	SRO	IF Feed and Bleed Criteria met go to step 20	
	SRO	Perform steps 21-25 quickly to establish Feed and Bleed	
	BOP	Ensure NC pumps off	
	BOP	Initiate S/I	
	BOP	Check NV pumps to cold legs indicating flow	
	BOP	Establish NC System Bleed path by opening 2 PZR PORV with open Isolation valves.	
	BOP	Close 1NV-151A and 1NV-150B	1NV-150B is deenergized
	BOP	Secure PZR Heaters	
	BOP	Perform Encl. 9 (Subsequent S/I Actions)	
	CREW	Maintain S/I Flow and 2 PZR PORVs Open	
	RO	Reset S/I and Sequencers	
	CREW	Restart S/I equipment on a BO	
	SRO	Check Containment pressure less than 3 psig	
	BOP	Establish VI to containment	
	SRO	Dispatch operators to stop NF AHU and place H2 Analyzers in service go to step 34	
	SRO	Check NS pumps off and go to step 35	
	RO	Reset CA modulating valves and close CA flow control valves	
	SRO	Attempt to establish Heat Sink With CA. Go to Step 7	
	RO	Attempt to establish CA flow	1A CA tagged (oil sample) have WCC clear tagout 1B CA no power TDCA (1SA-3 Is closed, linkage is broken)
	SRO	Contact WCC SRO to clear tagout on 1A CA pump and send operator to TDCA pump to reset 1SA-3	
	SRO	Continue on with FR-S.1 and attempt to establish a heat sink with CM	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	WCC informs that 1A CA pump is available	
	SRO	Returns to step 7 in FR-H.1	
	SRO	Attempt to establish CA flow to at least one S/G	
	RO	Check Power to both motor driven CA pumps	1A CA has power
	BOP	Check that CA valves have been aligned per Encl. 4	
	RO	Start 1A CA pump	
	RO	Check TD CA running	NO
	RO	Check total CA flow >450 gpm	At this point in scenario there should be a S/G with less than 12% WR At this point in scenario core exit T/C may be going up.
	SRO	A CA pump running and step 35 has been implemented .Go to Step 7h	
	RO	Check any S/G less than 12% WR	
	RO	Check core exit T/C stable or going down	
	SRO	Will direct RO to open CA control Valve to either A or B S/G (which ever had the highest level) to establish flow rate required to lower core exit T/C	
Terminate Scenario When Feed Flow has been established to one S/G			

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

Classification of Event: General Emergency due to:

- 1) Valid reactor trip signal received or required and automatic trip was not successful.

AND

- 2) Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing.

AND

- 3) Heat Sink CSF-RED

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: 350 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

PT/1/B/4250/028 Main Turbine Bearing Oil Pump Test is scheduled to be performed

Vibration readings are not required for PT/1/B/4250/028

Work Control SRO/Offsite Communicator

Tim

Plant SRO

Gary

NLO's AVAILABLE

Unit 1

Aux Bldg. Missy

Turb Bldg. Al

5th Rounds. Tom

Extra(s) Richard, Andy

Unit 2

Aux Bldg. Warren

Turb Bldg. Greg

Facility: McGuire

Scenario No.: 2

Op-test No.: _____

Examiners: _____

Operators: _____

Initial Conditions: 35% Power, 'B' Train Components in Service, '1A' Auxiliary Feedwater Pump is tagged, '1A' Diesel Generator is tagged, thunderstorms are in the area

Turnover: Remove FWPT from Service

Event No.	Malf. No.	Event Type*	Event Description
1		N	(RO) Remove FWPT from Service
2		C	(RO) 1CF-20 Feed Regulating Valve Fails OPEN
3		I	(BOP) Pressurizer Pressure Channel 1 Fails HIGH with Spray Valve Failure
4		C	(BOP) 1RN-187B Fails Closed – Loss of RN to KC
5		C	(RO) 1SB-12 Condenser Dump Fails OPEN
6		C	(BOP) 1KC-132 Erratic – Letdown Heat Exchanger Valve
7		M	SGTR with LOOP
			Failure of FWI, 2 rods fail to insert, Phase 'A' Train 'A' failure
			No Auto SI

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 21

TOPIC: Nuclear Regulatory Commission Simulator Exam

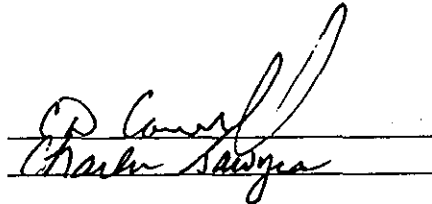
Scenario 2

REFERENCES:

1. McGuire Technical Specifications
2. OP/1/A/6100/003 Controlling Procedure for Unit Operation
3. AP/1/A/5500/01 Steam Leak
4. AP/1/A/5500/06 S/G Feedwater Malfunction
5. AP/1/A/5500/11 Pressurizer Pressure Anomalies
6. AP/1/A/5500/20 Loss of RN
7. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
8. EP/1/A/5000/E-3 Steam Generator Tube rupture
9. RP/O/A/5700/000 Classification of Emergency

Author:

Facility Review:



The image shows two handwritten signatures. The first signature is written over a horizontal line and appears to be 'CP Conner'. The second signature is written below the first and appears to be 'Charles Sawyer', also over a horizontal line.

April 3, 2003
Rev.1

EVENT SUMMARY

1. Remove from service one FWPT per OP/1/A/6100/003.
2. 1CF-20 (C S/G FRV) fails open. Enter AP-6
3. Pressurizer Pressure Channel 1 fails High. 1NC-27 fails open. Enter AP-11
4. 1RN-187B closes, Loss of RN to operating KC Hx. Enter AP-20
5. 1SB-3 (Condenser Dump Valve) fails open. Enter AP-1
6. 1KC-132 fails closed in Auto.
7. SGTR. Enter AP-10
8. Manual Rx Trip and SI. Enter E-0
9. Implement F-0 and Go to E-3 from E-0 step 21
10. LOOP

SIMULATOR OPERATOR INSTRUCTIONS

—	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC - 131	
<input type="checkbox"/>		RUN	
<input type="checkbox"/>		Update Status Board, Setup OAC Setup ICCM, Turbine Displays, & Trend Recorders. Check Rod Step Counters agree with rod positions	See Shift Turnover Information
<input type="checkbox"/>		(M) EPQ001A Set = 1	Loss of D/G "1A" Control Power
<input type="checkbox"/>		(LOA) CA009 Set = F	Rack out breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		(M) IPE001A (M) IPE001B	Defeats automatic reactor trips
<input type="checkbox"/>		(M) ISE003A	Phase A Train A isolation fails to actuate automatically
<input type="checkbox"/>		(M) ISE007A (M) ISE007B	FWI train A fails to actuate automatically FWI Train B fails to actuate automatically
<input type="checkbox"/>		(M) IRE010B8 (M) IRE010F2	Control Rod B8 stuck Control Rod F2 stuck

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>		(M) EMF171 (M) EMF174 Set as is	EMF-71 fails as is EMF-74 fails as is
<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"/>	Crew Briefing 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	(M) IFE006C Set 100, Ramp 20	Fails 1CF-20 (C S/g FRV) open
<input type="checkbox"/>	At direction of examiner	(XMT) NC038 Set 2500, Ramp 5 Trigger 1	Fails PZR Pressure Channel 1 HIGH
<input type="checkbox"/>	At direction of examiner	(M) ILE003A Set 100 Trigger 1	Fails 1 NC-27 open

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	(M) RN005E Set 0, Ramp 60	Fails 1RN-187 Closed
<input type="checkbox"/>	At direction of examiner	(M) IDE003A Set 100, Ramp 10	Fails open 1SB-3
<input type="checkbox"/>	At direction of examiner	(OVR) NV086B Set 100, Ramp 300	Fails 1KC-132 closed
<input type="checkbox"/>	At direction of examiner	(MAL) SG001A Set 450, Ramp 300	Tube leak 1A S/G
<input type="checkbox"/>	At direction of examiner	(M) EP001	LOOP
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

EVENT 1: Remove from service one FWPT per OP/1/A/6100//003

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Conduct a prejob brief	Prejob brief will be conducted prior to taking turnover.
	RO	Ensure AMSAC actuation is blocked	
	RO	Place FWPT's to Manual	
	RO	Raise speed on FWPT to remain in service until an increase is seen in <ul style="list-style-type: none"> • CF suction flow • CF header pressure • CF Hdr Press/ SM Hdr Press D/P • Turbine RPM 	
	RO	Lower speed on FWPT to be removed from service and raise speed on FWPT to remain in service while maintaining constant <ul style="list-style-type: none"> • CF header pressure • CF header flow • CF Hdr Press/SM Hdr Press D/p 	
	RO	S/D FWPT removed from service using OP/1/A/6250/001	
	RO	Reduce speed of FWPT to be S/D to minimum	
	RO	Verify CF pump Recirc is open	
	RO	Trip FWPT by holding Rest On Recirc valve closure circuit than trip FWPT	
	RO	Place FWPT in service in auto <ul style="list-style-type: none"> • Calculate program D/P • Adjust FWPT to obtain program D/P • Place FWPT in auto 	

Event 2: 1CF-20 fails open

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> A-3 C-3 	Per annunciator response and AP/06 the operator will swap failed channel to operable channel
	SRO	Enters AP/06 S/G Feedwater Malfunction	
	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"> Feed flow Steam Flow S/G Level 	<i>Immediate Action</i>
	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	
	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"> Selected control channels indicated correctly <ul style="list-style-type: none"> Feed flow Steam flow S/G level Affected S/G level restored to program level Automatic control is desired 	Automatic will not operate
	RO	Checks proper CF alignment	
	SRO	Checks procedure enter due to automatic control of 1CF-20 failing	
	SRO	Contacts WCC to write WR, have I&E repair failed valve and evaluate T.S. Exit procedure	Failure will not be repaired

Event 3: Pressurizer Pressure Channel 1 Failure HIGH with 1NC-27 failed open

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes/reports PZR pressure decreasing	
	SRO	Implements AP/11 Pzr Pressure Anomalies,	
	BOP	Checks Pzr Pressure decreasing	<i>Immediate action Yes</i>
	BOP	Checks all channels the same	<i>Immediate Action No Places PZR Press Cntrl Select to back up channel</i>
	BOP	Checks Pzr PORV's Closed	<i>Immediate action Yes</i>
	BOP	Checks Spray Valves Closed	<i>Immediate action 1NC-27 open takes controller to manual and closes valve</i>
	BOP	Checks Pzr PORV's - closed	
	BOP	Checks Spray Valves Closed	
	SRO	Go to Step 9	
	BOP	Checks NV-21A , CLOSED	
	BOP	Checks Pzr A,B & D heaters ON	<ul style="list-style-type: none"> • Place Pzr heaters mode select switch in manual • Turn on heaters as necessary to control pressure.
	BOP	Checks 1C PZR heater - ON	<p>If pressure below desired pressure, then:</p> <ul style="list-style-type: none"> • Place "Pzr PRESS MASTER" in manual • Control Pressure • When Pzr pressure return to normal and automatic control is desired the place Pzr master in auto.
	BOP	Checks Pzr pressure going UP	
	SRO	Go to step 22	
	SRO	Ensures "Pzr PRESS REC SELECT" is on an operable channel	
	SRO	Will notify WCC to write WR, have I&E investigate and repair and evaluate T.S.	<p>Failure will not be fixed</p> <p>T.S.: 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.c / 3.3.2.6.c / 3.3.2.8.b / 3.3.4.2 / 3.3.6.3 / 3.4.1 / 3.4.11</p>

Event 4: 1RN-187B (RN to KC Heat Exchanger) Fails CLOSED

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes loss of RN flow to KC HX	
	SRO	Go to AP-20 Loss of Operating RN Train – Case 1	
	BOP	Checks for potential loss of LLI <ul style="list-style-type: none"> • Check Unit 2 RN pumps that are aligned to LLI- operating properly • Check suction flow path - available 	EXAMINER CUE: Unit 2 RN pumps are operating properly
	BOP	Checks idle train available to start To start 1A RN pump performs the following Places manual loader for 1RN-89A to 10% OPEN Starts 1A RN Pump Ensures 1RN-86A OPEN	
	SRO	Go to step 4	Enclosures for local venting of RN pumps and NV Pump cooling via gravity drain have not been performed.
	BOP	Check 1A KC pumps on	No
	BOP	Check 1B KC pumps on	Yes
	BOP	Ensure 1KC-228B and 1KC-18B open Ensure 1KC-230A and 1KC-3A closed	
	BOP	Checks 1B RN pump running properly	If BOP answers no, he will place 1RN-187 in manual and open (the malfunction will prevent from opening). He will then be directed to secure the 1B RN pump. The SRO will then go to step 5 If the BOP answers yes, the SRO will go to step 5
	BOP	Throttles 1RN-89A to establish desired flow while maintaining less than 16,000 gpm	
	SRO	Investigate reason for loss of RN train	
	SRO	Ensure CR Area Chiller in Service per Encl.3.	Request Unit 2 RO to perform
	SRO	Swap operating equipment cooled by affected train of RN to opposite train	

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	<p>Swaps trains of KC per Enclosure 2</p> <ul style="list-style-type: none"> Limits KC flow to 4000 gpm per operating KC pump Checks the following open: <ol style="list-style-type: none"> 1RN-40A 1RN-41B 1RN-43A Any KC pump running Checks both ND pumps OFF Go to Step 19 Ensures 1RN-187B select switch is in manual Throttle open 1RN-89A to establish desired flow to 1A KC HX maintain less than 16,000 gpm Places 1KC-51A in the "AUTO" position Ensure 1KC-51A opens/cycles Starts 1A1 and 1A2 KC pumps Aligns Reactor Bldg header to 1A train as follows: <ol style="list-style-type: none"> Open 1KC-3A Open 1KC-230A Close 1KKC-228B Close 1KC-18B Checks both ND pumps OFF Places 1RN-187B Mode Select switch to Auto Check close 1RN-187B Places control switch for 1KC-54B to close position Stops 1B1 and 1B2 KC pumps <p>Stops 1B1 and 1B2 KC pumps</p>	
	BOP	<p>Swaps trains of NV per OP/1/A/6200/001B Enclosure 4.2</p>	Move to next event during swap of NV trains

Event 5: 1SB-3 (Condenser Dump Valve) Fails OPEN

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes symptoms of a steam leak <ul style="list-style-type: none"> • T-ave decreasing • Power increasing 	T-ave-Tref annunciator may come in alarm
	SRO	Enters AP-01 Steam Leak	
	Crew	Monitors fold out page	
	RO	Reduces turbine load to maintain: <ul style="list-style-type: none"> • Excore NI – less than 100% • NC loop D/Ts - less than 60 degrees • T-ave_i at T-ref 	
	BOP	Checks Pzr level – at or going to programmed level	
	SRO	Will return to step 3 if Pzr level can not be maintained.	
	RO	Announces occurrence on page	
	RO	Identifies and isolates leak: <ul style="list-style-type: none"> • Checks S/G PORVs – CLOSED • Checks condenser dump valves – 1 OPEN • Checks containment conditions – NORMAL • Checks turbine driven CA pump – OFF • Checks steam line drain valves – CLOSED • Checks Unit 2 – steam header pressure 	A condenser dump valve will be OPEN – RO must select “OFF RESET” on Steam dump interlock Bypass channel A and B. Due to failure valve will not close. SRO will call WCC to have valve isolated locally.
	SRO	Exits procedure when leak is isolated.	

Event 6: 1KC-132 fails Closed

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Acknowledges L/D heat exchanger Outlet High Temp Annunciator	Takes action per ARP
	BOP	Takes manual control of 1KC132. Opens valve, lowers L/D Hx outlet temperature.	
	SRO	Calls WCC to have WR written and Have I&E investigate and repair.	

Event 7: SGTR on "A" S/G

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes symptoms of SGTR	
	SRO	Enters AP-10 Case 1	
	RO	Checks PZR level Stable or going up	
	BOP	Performs the following <ul style="list-style-type: none"> • Charging flow <175 gpm • Ensures 1NV-238 opening • Open 1NV-241 maintain 6 gpm seal flow • Isolate letdown • Start 1A NV pump 	
	SRO	IF PZR level going down with max Charging flow Direct Tripping of Reactor and ensure S/I initiated.	

Event 7: SGTR on "A" S/G E-0 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enters E-0	
	Crew	Monitors Foldout page	
	RO	Check Reactor Trip: <ul style="list-style-type: none"> rod bottom lights reactor trip breakers open I/R amps decreasing 	<i>Immediate action</i> All rod bottom lights will not be lit due to 2 rods being stuck out. Per RNO RO will trip Reactor and SRO and RO should determine the Reactor is tripped.
	RO	Check Turbine Generator tripped <ul style="list-style-type: none"> TV's closed 	<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"> Groups 1,2 and 5 DARK Group 3 LIT Checks OAC in service 	
	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"> ensure both trains Phase A Isolation are initiated Align or start S/I and Phase A components with individual windows in Group 4 as required.
	BOP	Check the following on Monitor Light Panel Group 4 LIT <ul style="list-style-type: none"> C-3 C-6 F-4 F-5 	Auto Action of FWI is blocked BOP will <ul style="list-style-type: none"> Check OAC Monitor Light Program for associated light Align valves as required while SRO continues on with the procedure.
	RO	Checks CA is running and at least 3 S/G's NR level > 17%	

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Checks KC pumps running	
	BOP	Checks RN pumps running	
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	EXAMINER CUE: • 2A RN pump is running
	RO	Checks all S/G pressures > 775 psig	
	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	BOP will ensure ND pump mini-flow valves are open
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 21	EXAMINER CUE: OSM will ensure Generic Enclosure 21 implemented.
	RO	<ul style="list-style-type: none"> Checks CA flow > 450 gpm and takes control of CA to maintain no load levels checks VI header pressure > 60 psig Maintains N/R level between 11% and 50% 	
	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.	
	RO	Checks all main steam lines INTACT	
	RO/ BOP	Report S/G tube rupture parameters indicate that S/G tubes NOT intact	PER RNO Implement F-0 and Go to E-3
	SRO	Implement CSF Status Trees and go to E-3	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enter E-3	
	CREW	Monitor foldout page	
	RO/ BOP	Identify "A" as the ruptured S/G	
	RO	Check at least one S/G - AVAILABLE FOR NC SYSTEM COOLDOWN	
	RO	Isolate steam flow from ruptured S/Gs as follows: <ul style="list-style-type: none"> • checks ruptured S/G PORV closed • check S/G 1B and 1C INTACT • check 1BB-1B and 1BB-5A Closed • close 1SM-83 	
	RO	Close the following on ruptured S/Gs: <ul style="list-style-type: none"> • MSIV • MSIV bypass valve 	
	RO	Checks ruptured S/G NR levels greater than 11% Isolates feed flow to "A" S/G <ul style="list-style-type: none"> • Close 1CA-66A • Close 1CA-62A 	
	BOP	Checks Pzr PORV and isolation valves: <ul style="list-style-type: none"> • Power to all Pzr PORVs available • All Pzr PORVs CLOSED • At least one Pzr PORV isolation valve OPEN 	
	RO	Checks main stream lines intact: <ul style="list-style-type: none"> • All S/G pressures stable or going up • All S/G pressurized 	
	BOP	Reset the following: <ul style="list-style-type: none"> • S/I • Sequencers • Phase A isolation • Phase B isolation 	
	BOP	Established VI to containment <ul style="list-style-type: none"> • 1VI-129B open • 1VI-160B open • 1VI-150B open • Checks VI header pressure > 85 psig. 	
	RO	Controls intact S/G levels: <ul style="list-style-type: none"> • N/R level in all intact S/Gs > 11% • Throttles feed flow to maintain intact S/Gs N/R levels between 22% and 50% 	
	BOP	Checks 1ETA and 1ETB energized by offsite power	
	SRO	Checks ruptured S/G identified	

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Checks the following closed on ruptured S/G: <ul style="list-style-type: none"> • MSIV • MSIV bypass valve 	
	RO	Checks ruptured S/G pressure greater than 280 psig.	
	BOP	Checks any NC pump running	
	BOP	When P-11 status light lit then block steamline isolation and maintains NC pressure less than 1955 psig.	
	RO	Initiate a NC system cooldown as follows: Determine required core exit temperature based on lowest ruptured S/G pressure. Check Condenser available <ul style="list-style-type: none"> • COND AVAILABLE FOR STEAM DUMP" status light – LIT • MSIV on intact S/Gs OPEN Place Steam Dumps in steam pressure mode. When P-12 stat light lit place steam dumps in bypass interlock. Dump steam to condenser at max rate.	Once the RO has initiated a cooldown a LOOP will occur.
	CREW	Recognizes the LOOP B D/G starts and energizes ETB. ETA is deenergized due to 1A D/G tagged. Restarts S/I equipment previously on.	
	SRO	Recognizes NCPs are off and loss of condenser Vacuum. Returns to Step 15 in E-3	
	BOP	Checks any NC pump running	
	BOP	When P-11 status light lit then block steamline isolation and maintains NC pressure less than 1955 psig.	

Time	Pos.	Expected Actions/ Behavior	Comments
	RO & BOP	<p>Initiate a NC system cooldown as follows:</p> <p>Determine required core exit temperature based on lowest ruptured S/G pressure.</p> <p>Check:</p> <ul style="list-style-type: none"> • COND AVAILABLE FOR STEAM DUMP" status light – LIT • MSIV on intact S/Gs OPEN <ol style="list-style-type: none"> 1. If Pzr pressure is greater than 1955 psig, then depressurize to 1900 psig using Pzr PORV. 2. Depress "BLOCK" on low pressure steam line isolation block switches 3. Maintain NC pressure less than 1955 psig. 4. Ensure Main Steam Isolation reset. 5. Ensure S/G PORVs reset. 6. Dump steam using all intact S/Gs PORVs at maximum rate as follows: <ul style="list-style-type: none"> • Close S/G PORV manual loader on ruptured S/G • Place intact S/G PORV manual loaders at 50% • Select "MANUAL" on "SM PORV MODE SELECT" • Adjust manual loader on intact S/G PORVs as required to control intact S/G depressurization rate at approximately 2 psig per second. <p>Check low pressure steamline isolation – BLOCKED</p> <p>Check core exit T/Cs – less than required temperature.</p> <p>Stop NC system cooldown</p> <p>Maintain core exit T/Cs less than required temperature.</p>	
	RO	Checks ruptured S/G pressure – stable or going up	
	SRO	Checks NC subcooling based on core exit T/Cs > than 20 degrees	
	BOP	<p>Depressurizes the NC system</p> <ol style="list-style-type: none"> 1. Checks ruptured S/G NR level less than 73% 2. Checks normal Pzr spray available 	Observe caution prior to step 21 and go to step 21
	BOP	Depressurize NC system using one PZR PORV	

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Close PZR PORV when one of the following is satisfied <ul style="list-style-type: none"> • NC Subcooling < 0 • PZR level >76% • NC pressure < ruptured S/G pressure & PZR level > 11% 	
	BOP	Check NC System Pressure going up	
	Crew	Checks for S/I termination criteria <ol style="list-style-type: none"> 1. NC subcooling greater than 0 degrees 2. Secondary heat sink 3. NC pressure – stable or going up 4. Pzr level greater than 11% 	Must meet all criteria to terminate.
	BOP	Stop NI pumps and one NV pump	
	BOP	Check NV pump suction aligned to FWST Open 1NV-150B & 1NV-151A Close 1NI-9A & 1NI-10B	
Terminate Scenario			

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

Classification of Event: Site Area Emergency due to:

- 1) Release of Secondary side to atmosphere with primary to secondary leakage > Tech Spec allowable.
- AND**
- 2) Primary- to- Secondary leak rate exceeds the capacity of one charging pump in the normal charging mode with letdown isolated.

SHIFT TURNOVER INFORMATION

UNIT 1 STATUS:

Power Level: 40% NCS [B] 13 ppm Pzr [B]: 13 ppm Xe: 2895pcm

Power History: At this power for 400 days Core Burnup: 440 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 PM
Unit 2 is available for Auxiliary Steam
Remove 1B FWPT from service and Shutdown per OP/1/A/6100/003 Encl. 4.2 Step 3.6.13 to repair oil leak.

Work Control SRO/Offsite Communicator

Tim

Plant SRO

Gary

NLO's AVAILABLE

Unit 1

Aux Bldg. Missy

Turb Bldg. Al

5TH Rounds. Tom

Extra(s) Richard, Andy

Unit 2

Aux Bldg. Warren

Turb Bldg. Greg

Facility: McGuire

Scenario No.: Spare

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, thunderstorms are in the area

Turnover: Reduce Turbine Load to 90% to Perform Turbine Valve Movement Test

Event No.	Malf. No.	Event Type*	Event Description
1		N	(RO) Reduce Turbine Load
2		I	(BOP) Tcold Failure HIGH
3		I	(RO) S/G 'A' Narrow Range Level Fails LOW
4		C	(RO) Power Range N-42 Fails HIGH
5		C	(BOP) Pressurizer Level Master Failure
6		C	(BOP) NC System Leak 50 gpm
7		M	Rod Ejection
			No Auto SI, Phase 'B' Train 'A' Fails to Actuate in Automatic

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 21

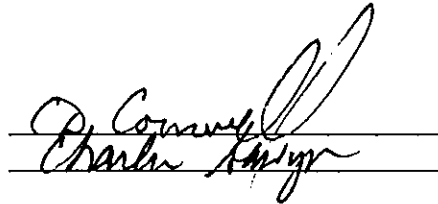
TOPIC: Nuclear Regulatory Commission Simulator Exam
Scenario Spare

REFERENCES:

1. McGuire Technical Specifications
2. OP/1/A/6100/003 Controlling Procedure For Unit Operation
3. AP/1/A/5500/06 S/G Feedwater Malfunction
4. AP/1/A/5500/10 NC System Leakage within Capacity of Both NV
Pumps
5. AP/1/A/5500/14 Rod Control Malfunction
6. AP/1/A/5500/16 Malfunction of Nuclear Instrumentation
7. EP/1/A/5000/E0 Reactor Trip or Safety Injection
8. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:



April 3, 2003
Rev.1

EVENT SUMMARY

1. Reduce power in preparation for Turbine Valve Movement Test.
2. B NC loop T Cold fails High. Enter AP-14
3. D S/G NR Level Channel 1 fails Low. Enter AP-6
4. PR-42 fails. Enter AP-16
5. PZR Level Master fails
6. NC System Leak. Enter AP-10
7. Rods Ejection 2000 gpm NC system leak. Enter E-0

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC - 127	
<input type="checkbox"/>		RUN	
<input type="checkbox"/>		Update Status Board, Setup OAC Setup ICCM, Turbine Displays, & Trend Recorders. Check Rod Step Counters agree with rod positions	See Shift Turnover Information
<input type="checkbox"/>		(M) EPQ001A Set = 1	Loss of D/G "1A" Control Power
<input type="checkbox"/>		(LOA) CA009 Set = F	Rack out breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		(M) IPE001A (M) IPE001B	Defeats automatic reactor trips
<input type="checkbox"/>		(M) DEH003A	Failure of Auto Turbine tripped blocked
<input type="checkbox"/>		(M) ISE003B Sel + BLK Auto	Failure of Phase "A" train "B" to actuate automatically

	Bench Mark	ACTIVITY	DESCRIPTION
		(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"/>	Crew Briefing 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) NC102 Set = 630, Ramp = 10	B NC Loop T-Cold fails High
<input type="checkbox"/>	At direction of examiner	(XMT) CF008 Set = 0, Ramp 10	"A" S/G N/R Level Channel 1 fails Low
<input type="checkbox"/>	At direction of examiner	(M) ENB013D Set =200, Ramp = 10	Power Range N-42 fails High
<input type="checkbox"/>	At direction of examiner	(OVR) NC111 Set =100, Ramp = 60	PZR Level Master fails High
<input type="checkbox"/>	At direction of examiner	(M) NC007A Set = .25, Ramp = 300	NC System leak 50 gpm
<input type="checkbox"/>	At direction of examiner	(M) NC005 Set = 2000	Ejected rod M8. Leak rate increases to 2000 gpm
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

Event 1: Reduce Load per OP/1/A/6100/003 Step 3.2

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Notify SOC	
	RO	Check quality Thermal power best OAC points	
	BOP	Operate PZR Heaters per OP/1/A6100/003 Encl.4.3	
	RO	Reduce Turbine load per OP/1/A/6300/001 A (Turbine Generator Load Change)	
	CREW	Maintain Control Rods within insertion and withdrawal limits per COLR	
	CREW	Maintain AFD within Target Band	
	RO	At 98% power Place MW Loop in service	

Event 2: B NC Loop T Cold fails High

Time	Pos	Expected Actions/ Behavior	Comments
	RO	Recognizes Unwarranted Control Rod Insertion and informs Crew.	Annunciator AD-6 B -10 T-ref/T-auct Abnormal
	SRO	Enters AP-14. Stops load decrease	
	RO	If more than one rod dropped – trip Rx	<i>Immediate action</i>
	RO	Places CRD Bank Selector Switch to manual and verifies movement stopped	<i>Immediate action</i>
	RO	Check all control banks aligned with associated bank	
	RO	Checks Rod Control Urgent Failure alarm DARK	
	RO	Checks to following reactor control instruments NORMAL <ul style="list-style-type: none"> • Turb Imp Press Ch 1 • T-ref indication • "1A" NC loop T-ave • "1B" NC loop T-ave • "1C" NC loop T-ave • "1D" NC loop T-ave 	Loop "B" T-ave identified Go to Enclosure 4
	SRO	Goes to Enclosure 4	
	BOP	Announce occurrence on page	
	CREW	Evaluates the following prior to any control rod withdrawal: <ul style="list-style-type: none"> • Ensures no inadvertent mode change will occur. • Ensures rods are withdrawn in a deliberate manner. 	
	RO	Checks the following normal: <ul style="list-style-type: none"> • Turb Imp Press Ch 1 • T-ref indication 	
	RO	Checks the following normal: <ul style="list-style-type: none"> • "1A" NC loop T-ave • "1B" NC loop T-ave • "1C" NC loop T-ave • "1D" NC loop T-ave 	<p>Loop "B" Tave identified BOP will perform the following:</p> <ul style="list-style-type: none"> • Places D/T Defeat switch to failed loop • Places T-ave Defeat switch to failed loop <p>RO will perform the following as necessary to maintain T-ave at T-ref:</p> <ul style="list-style-type: none"> • Position control rods in manual • Borate/Dilute NC system • Adjust turbine load <p>When T-ave at T-ref +/- 1 degree and auto rod control is desired, then return rod control to auto.</p> <ul style="list-style-type: none"> • Ensure P-12 is in required state for existing plant conditions

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Instructs IAE to trip bistables for failed channel within 6 hours of failure. <ul style="list-style-type: none"> • OPDT • OTDT • Low T-ave 	Tech Spec 3.3.1 and 3.3.2
	SRO	Checks if failed channel has been identified	YES
	SRO	Call WCC SRO and have WR written, IAE to investigate and repair and evaluate T.S.	

Event 3: "A" S/G NR Level channel 1 fails Low

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> A-1 B-1 	Annunciators on 1AD-4 Per annunciator response and AP/06 the operator will swap failed controller from normal to alternate
	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"> Feed flow Steam Flow S/G Level 	<i>Immediate Action</i>
	BOP	Announce Occurrence on page	
	BOP	Check Reactor Trip Breakers closed and > P-11	
	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	
	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"> Selected control channels indicated correctly <ul style="list-style-type: none"> Feed flow Steam flow S/G level Affected S/G level restored to program level Automatic control is desired 	
	RO	Checks proper CF alignment	
	SRO	Contacts WCC to have WR written, have I&E investigate and repair failed channel and evaluate T.S. Exit procedure	Failure will not be repaired

Event 4: PR-42 fails High

	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognize symptoms of a Power Range Detector failure.	
	SRO	Enters AP-16 Case III	
	RO	Places Rods in "Manual"	<i>Immediate action</i>
	RO	Checks S/G's at programmed level	
	BOP	Announce occurrence on page	
	RO	Checks N-42 as only failed channel	
	RO	Position "PR to S/G Program Level Channel Defeat" switch to defeat inoperable channel.	
	RO	Reports power stable	
	BOP	Complete steps to take channel out of service and verifies proper lights - lit	
	RO	Ensure operable PR channel selected to record on NR45 chart recorder	
	RO	Adjusts control rods to maintain T-Ave = T-Ref	
	RO	When T-Ave = T-Ref to within + or - 1 deg-F, then return Rods to "Auto" if desired	
	SRO	Instruct IAE to fail associated B/S's for failed channel <ul style="list-style-type: none"> • OPDT • OTDT 	
	BOP	When IAE trips B/S's, verifies proper status lights - lit	
	SRO	Call WCC to have WR written, have I&E investigate and repair and have T.S. evaluated	Instrument will not be repaired T.S. 3.3.1.2 / 3.3.1.3 / 3.3.1.6 / 3.3.1.7 / 3.3.1.16.b / 3.3.1.16.c / 3.3.1.16.d

Event 5: Pressurizer Level Master fails High.

	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognize charging flow increasing.	
	CREW	Determine from plant conditions (NC System temperature and pressure stable and PZR level going up) that there is an instrument failure.	
	SRO	Direct BOP to place 1NV-238 in manual and control charging flow.	
	SRO	Contact WCC to write WR, have I&E investigate and repair.	

Event 6: NC System Leak 50 gpm

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognize symptoms of a system leak	
	SRO	Enters AP-10 Case 2	
	BOP	Check PZR Level stable or going up	
	BOP	<ul style="list-style-type: none"> • Maintain charging flow <175gpm • Ensure 1NV-238 opening • Open 1NV-214 maintain 6gpm seal flow • Reduce or isolate letdown • Start additional NV pump 	
	CREW	Check PZR Level stable or increasing. If at any time PZR Level goes down return to step 1	
	BOP	Check PZR Pressure Stable or trending to 2235 psig	
	RO	Check Main Steam Lines intact	
	RO	Announce Occurrence on Page	
	CREW	Estimate leak rate	
	SRO	Refer to RP/0/A/5700/000	
	BOP	If at any time NC leakage exceeds T.S. place in service Outside Air Pressure Filter Train	
	SRO	Have another SRO evaluate if leakage exceeds SLC 16.9.7 condition C limits	
	BOP	If VCT level less than 16% swap NV pump suction to FWST	
	BOP	Check seal leakoff on NC pumps greater than 6 gpm	
	BOP	Check Thermal Barriers intact	
	SRO	Check if leak suspected on Letdown line near Demineralizers	
	SRO	Check leak on Letdown line	
	SRO	Check VCT intact	
	BOP	Check the following normal, PZR Safeties, PZR PORVs and PRT conditions	
	BOP	Check CLA levels normal	
	BOP	Check NCDT parameters normal	
	BOP	Check Containment floor and equipment sumps normal	
	SRO	Check leak location identified	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Contact Station Management to evaluate need to Shutdown	
	SRO	Check unit shutdown required	
	SRO	Shutdown per AP-4	
	SRO	Enter AP-4	
		Initiate a 2000 gpm leak by ejecting control rod M8	

Event 7 NC System leak 2000 gpm due to ejected rod

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to E-0 and directs activities	
	SRO	Reviews Foldout page with crew	NCP trip criteria based on loss of subcooling
	RO	Report Reactor Trip: <ul style="list-style-type: none"> • rod bottom lights • reactor trip breakers open • I/R amps decreasing 	<i>Immediate Action</i> Reactor will be tripped manually
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> • TV's closed 	<i>Immediate Action</i> Turbine will be tripped manually
	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"> • Groups 1,2 and 5 DARK • Group 3 LIT • Checks OAC in service 	
	BOP	Reports all Ss and St components in Group 4 LIT	
	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	EXAMINER CUE: <ul style="list-style-type: none"> • 2A RN pump is running
	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	

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"> • checks NC pressure < 1600 psig • checks NI pumps indicating flow • checks NC pressure < 286 psig • checks ND pumps indicating flow 	
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 21	EXAMINER CUE: OSM will ensure Generic Enclosure 21 is implemented.
	RO	<ul style="list-style-type: none"> • Checks CA flow > 450 gpm and takes control of CA to maintain no load levels • checks VI header pressure > 60 psig • Maintains N/R level between 32% and 50% 	
	BOP	<ul style="list-style-type: none"> • If any NC pump ON, then check Tave stable or trending to 557 degrees • If all NC pumps off, then check NC T-colds stable or trending to 557 degrees. 	If not stable and decreasing crew will go to Enclosure 3
	BOP	Reports Pzr PORV & Spray Valves closed	One PORV will be open but isolated
	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"> • Containment EMFs – normal • Ice Condenser Lower Inlet Doors Open alarm – DARK • Containment pressure < 1 psig • Containment sump level normal 	
	SRO	Implement F-0	
	CREW	Evaluate CSF trees	
	SRO	Enter FR-P.1	

Event 7 FR-P.1 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Reports NC pressure < 286 psig	
	BOP	Reports ND pump flow is > 500 gpm	
	SRO	Return to procedure and step in effect and enters FR-Z.1	

Event 7 FR-Z.1 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Determine a loss of emergency coolant recirc has not occurred and continue in procedure	
	Crew	Monitors foldout page	
	BOP	Ensure NC pumps and RV pumps are off.	
	SRO	Dispatches operator to close breakers for 1NI-173A and 1NI-178B	
	BOP	Reports containment pressure less than 15 psig	
	BOP	Reports both NS pumps on	
	SRO	Continues in FR-Z.1	
	SRO	Checks OAC in service	
	SRO	Checks the following light lit on group 4 <ul style="list-style-type: none"> • C-3 • C-6 • G-4 • G-5 	
	SRO	Checks NS system in operation as follows <ul style="list-style-type: none"> • ECA 1.1 in effect - NO 	Go to step 10.d
	BOP	Checks the following valves aligned <ul style="list-style-type: none"> • 1NS-18A - closed • 1NS-20A - open • 1NS-1B closed • 1NS-3B – open 	
	BOP	Reports containment pressure greater than 3 psig Checks the following valves open <ul style="list-style-type: none"> • 1NS-32A and 1NS-29A • 1NS-12B and 1NS-15B • checks NS pumps on 	
	BOP	Check phase "B" HVAC equipment per Encl.3	
	RO	Checks MSIVs and MSIV bypass valves closed	
	RO	Checks steam lines intact	
	SRO	Checks if any ND train is operating in the cold leg recirc mode – NO. When transfer to Cold Leg Recirc is complete perform step 14. Go to step 15	
	SRO	Ensures operator sent to stop NF AHUs Checks H2 analyzers in service NO. Send operators to put H2 Analyzers in service Go to step 16	
	SRO	Returns to procedure and step in effect. Goes to 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)	NOTE: 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 <ul style="list-style-type: none"> All S/G pressures - STABLE OR GOING UP All S/Gs - PRESSURIZED 	
	RO	Checks S/G level > 32%. Resets CA Modulating Valves Reset switches and throttles CA flow as necessary to maintain 32-50%	
	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: <ul style="list-style-type: none"> 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 Go to step 11	
	SRO/ BOP	Reset SI and Load Sequencers and dispatch operator to locally stop D/Gs	
	SRO	Dispatch operators to locally stop NF AHUs and place H2 Analyzers in service	

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	Power will not be available to "A" train valves
	BOP	Report NC pressure < 286 psig and ND flow to cold legs is > 500 gpm	
	SRO	Go to step 15 Checks transfer to cold leg recirc criteria <ul style="list-style-type: none"> FWST level < 180 inches If not return to step 13	

Event 7 ES-1.3 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enters ES-1.3 on FWST low level	This procedure should be implemented without delay.
	SRO	Have STA monitor fold out page	
	SRO	This procedure should be implemented without delay.	
	BOP	Checks containment sump level >3 feet	
	BOP	Checks KC flow to ND heat exchangers > 5000 gpm	
	BOP	Resets SI and Load Sequencers	
	BOP	Checks NI-185A and 1A ND pump - ON	
	BOP	Checks NI-184B and 1B ND pump - ON	
	BOP	Closes 1FW-27A and checks ND pumps On	
	BOP	Aligns NV and NI systems <ul style="list-style-type: none"> • Check NC pressure < 1600 psig • Close 1NI-115B & 1NI-144B • Close 1NI-147A • Close 1ND-30A & 1ND-15B • Check open 1NI-334B • Open 1NI-332A & 1NI-333B • Open 1ND-58A & 1NI-136B • Close 1NI-100B • Close 1NV-221A & 1NV-222B 	
Terminate Scenario upon direction of Examiner			

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

Classification of Event: Alert due to Greater than available makeup capacity as indicated by loss NCS subcooling.

SHIFT TURNOVER INFORMATION

UNIT 1 STATUS:

Power Level: 100% NCS [B] 13 ppm Pzr [B]: 13 ppm Xe: 2895pcm

Power History: At this power for 400 days Core Burnup: 440 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 PM

Unit 2 is available for Auxiliary Steam

Reduce power per OP/1/A/6300/001 (Controlling Procedure for Unit Operation) Encl. 4.2 in preparation for Main Turbine Throttle Valve Movement Test.

Work Control SRO/Offsite Communicator

Thad

Unit 2 SRO

Jim

NLO's AVAILABLE

Unit 1

Aux Bldg. Eric

Turb Bldg. Fred

Extra(s) Mark, Bruce

Unit 2

Aux Bldg Bill

Turb/Service Bldg Buster