

INITIAL SUBMITTAL

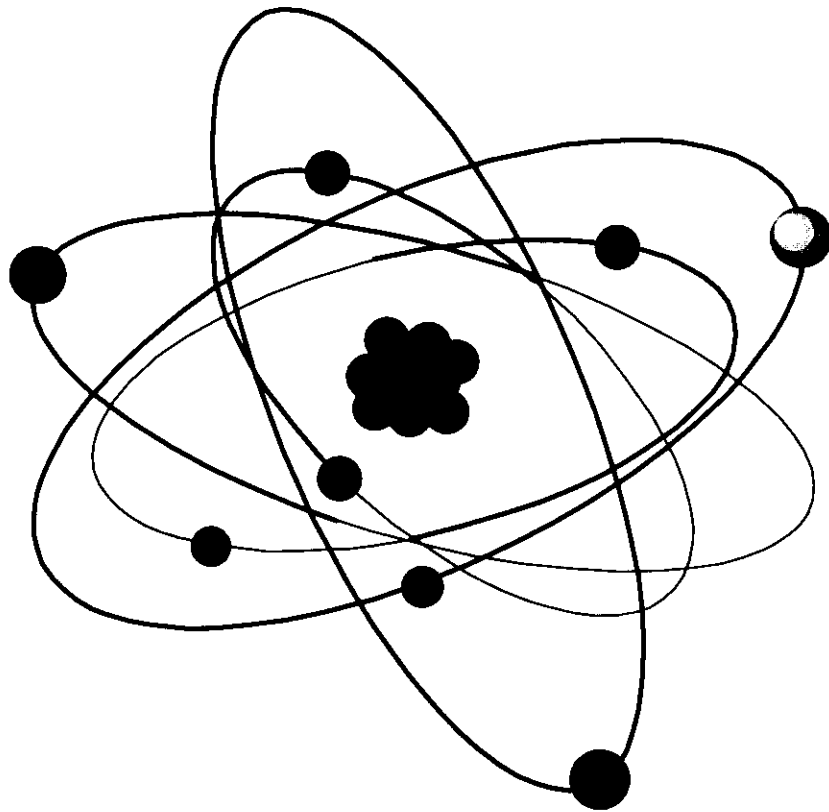
**MCGUIRE EXAM 2000-301
50-369, 370/2000-301**

**MAY 8 - 12, MAY 19,
MAY 22 - 25, 2000**

INITIAL SUBMITTAL

**SIMULATOR SCENARIOS
*AND OUTLINES***

NRC COPY



**2000
SIMULATOR SCENARIOS**

Facility: McGuire	Scenario No.: 1	Op-test No.: _____
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	
Objectives: _____		

Initial Conditions: 100% Power/ "B" Train Components in Service/		
Turnover: "1A" D/G Tagged/ "1A" AFW pump tagged/ Switchyard work in progress/ Unit 1 has .6 gpm unidentified leakage/ 1EMF-33 inoperable/ "1B" S/G SM PORV Isolated due to leak/ Unit 2 is available for auxiliary steam/ Begin load reduction for refueling		

Event No.	Malf. No.	Event Type*	Event Description
1		R	Boration/Rod Insertion on load reduction
1		N	Load Reduction
2		I BOP)	Pressurizer level channel 1 fails - LO
3		I(RO)	S/G "C" Steam Pressure Channel 1 Failure - High
4		C(BOP)	RN to KC Heat Exchanger Valve Failure
5		C(RO)	Failure of the turbine to runback automatically
6		M(ALL)	ATWS/Loss of Heat Sink
			Post major event failures
			Turbine Driven CA Pump trips on overspeed
			"B" Train Motor Driven CA pump trips on over current
			Automatic Phase "A" on "B" train does not work
			No automatic Safety Injection
			The loss of nuclear service water (RN) is a DAS at McGuire. It comprises 13% of the important core melt events.

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 19

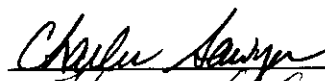

TOPIC: Nuclear Regulatory Commission Simulator Exam

Scenario 1

REFERENCES:

1. McGuire Technical Specifications
2. AP/1/A/5500/06 Loss of S/G Feedwater
3. AP/1/A/5500/12 Loss of Letdown, Charging or Seal Injection
4. AP/1/A/5500/03 Load Rejection
5. AP/1/A/5500/20 Loss of Nuclear Service Water
5. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
6. EP/1/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS
7. EP/1/A/5000/FR-H.1 Response to Loss of Secondary Heat Sink
8. RP/O/A/5700/00 Classification of Emergency

Author:
Facility Review:
NRC Review"

March 10, 2000
Rev.1

SIMULATOR OPERATOR INSTRUCTIONS

—	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC-145	
<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) CA010 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
<input type="checkbox"/>		(M) ISE3 Sel + BLK Auto	Failure of Phase "A" train "B" to actuate automatically
<input type="checkbox"/>		(M) CA009B	"B" CA pump trips on overcurrent

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>		(M) CA005	Turbine Driven AFW pump trips on over speed
<input type="checkbox"/>		(M) EMF133 Set – AS IS	EMF – 33 False reading
		(M) ISE002A (M) ISE002B	Failure of automatic Safety Injection – both trains
		(M) NV035A	NV-35A Fails Open
<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) ILE0001 Set = 0, Ramp = 5	Fails Pzr Level Channel 1 LOW
<input type="checkbox"/>	At direction of examiner	(XMT) SM020 Set = 120, Ramp 10	Fails S/G "C" Steam Pressure Channel 1 HIGH
<input type="checkbox"/>	At direction of examiner	(OVR)RN-079 Set = 0 Ramp = 10	Fails RN-190 closed. – RN to KC heat exchanger outlet valve

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	(M) LF002A (M) LF003A	Initiates a oil leak on 1A FWPT Trips the "1A" FWPT if necessary – Initiates an turbine runback – RO must manually runback the turbine
<input type="checkbox"/>	At direction of examiner	(M) LF003B	Trips the "B" FWPT and initiates an ATWS
<input type="checkbox"/>		(MAL) IPE001A (MAL) IPE001B	Delete – Opens reactor trip breaker 30 seconds after request by operator Monitor S/G WR level and trip at 10%
		(MAL) ISE007A (MAL) ISE007B	Allows feedwater to be reset in H-1
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

Event: Pressurizer Level Channel 1 Failure

	Pos.	Expected Actions/ Behavior	Comments
	BOP	On a loss of letdown ensure the following closed: <ul style="list-style-type: none"> • 1NV-458A • 1NV-457A • 1NV-35A 	1NV-35A will not close – BOP must attempt to close. Immediate action of AOP.
	SRO	Enters AP/12 Loss of Letdown, Charging or Seal Injection	
	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 1NV-2A closed due to failure
	RO	Stop and power or temperature changes in progress	
	RO	Announces occurrence on page	
	BOP	Checks "1B" NV pump - ON	
	BOP	Checks to following NV pump parameters stable: <ul style="list-style-type: none"> • Motor AMPs • Charging header pressure • Charging flow 	
	BOP	Checks seal injection flow parameters: <ul style="list-style-type: none"> • Seal flow to each NC pump > 6 gpm • Seal Water Inj Filter Hi D/P alarm - DARK 	
	SRO	IF this AP entered due to loss of letdown only, then go to step 35.	SRO will go to step 35 in this AOP
	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	

Missing any response to actual failure (Pzr lvl ch 1 failed low). Need to add.

EVENT: Normal Operations - Load Decrease
Turbine Load Decrease

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO RO	Notifies SOC of load decrease	
	SRO RO	Increases load per OP/1/A/6300/001A and OP/1/A/6100/03 Determines load changing rate	
	RO	Depress the "LOAD RATE" pushbutton	
	RO	Set the selected rate of load change in the "Variable Display" window	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "REFERENCE" pushbutton	
	RO	Set in the desired load	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "GO" pushbutton	
	RO	Verify that the load starts to change at the selected rate	

Event: Normal Operations - Load Decrease
Rod Insertion

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Provide guidance to RO on expectations for rod withdrawal on load insertion. <ul style="list-style-type: none"> maintains control rods within insertion limits AFD within target band 	SRO should provide some general guidance as to using rods to maintain Tave within a pre-determined range of Tref.
	RO	Will insert rods as necessary based on instructions from SRO	
	BOP	Will borate NC system per guidance provided	

Event: Pressurizer Level Channel 1 Failure

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Checks Pzr heater group supply breakers - closed	<p>NO, due to level instrument failure</p> <p>BOP will perform the following:</p> <ol style="list-style-type: none"> Ensures the following are selected to an operable channel <ul style="list-style-type: none"> "Pzr level control select" "Pzr level rec select" Ensure Pzr level greater than 17% Place the following switches in "MAN" <ul style="list-style-type: none"> "A Pzr htr mode select" "B Pzr htr mode select" "D Pzr htr mode select" Close the following breakers: <ul style="list-style-type: none"> "A Pzr htr grp sup bkr" "B Pzr htr grp sup bkr" "D Pzr htr grp sup bkr" Return the following switches to "AUTO" as desired. <ul style="list-style-type: none"> "A Pzr htr mode select" "B Pzr htr mode select" "D Pzr htr mode select" Close "C Pzr htr grp sup bkr"
	BOP	<p>Checks the following OPEN</p> <ul style="list-style-type: none"> 1NV-1A 1NV-2A 	NO, go to step 42
	SRO	<p>Checks to see if immediate restoration of normal letdown is possible</p> <ul style="list-style-type: none"> Both NV 1 & 2 open in the past 30 minutes Orifice isolation valves closed before or at the same time as NV 1 & 2. 	<p>Orifice isolation valve NV-35 has not closed. So will go to step 47 to place excess letdown in service.</p> <p><i>May have to provide management guidance that excess letdown is desired.</i></p>

Event: Pressurizer Level Channel 1 Failure

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Establish excess letdown 1. Opens the following: <ul style="list-style-type: none"> • 1KC-315B and 1KC-305B • Places 1NV-27B to VCT position 2. Opens and closed 1NV-26 3. Checks the following OPEN: <ul style="list-style-type: none"> • 1NV-94AC • 1NV-95B 4. Opens 1NV-24B and 1NV-25B 5. Slowly opens 1NV-26 while maintaining excess letdown temp. less than 200 degrees.	
	SRO	Go TO step 47.n	
	BOP	Notified chemistry that excess letdown is in service. Adjust charging flow as desired while maintaining: <ul style="list-style-type: none"> • NC pump seal injection flow greater than 6 gpm • Pzr level at program level 	
	SRO	End of procedure	

Event: Steam Generator "1C" Steam Pressure Channel 1 Fails HIGH

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> B-3 C-3 	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	Immediate Action step
	RO	Checks the following channel indicating the same: <ul style="list-style-type: none"> Feed flow Steam Flow S/G Level 	Immediate Action step Selects operable channel
	RO	Checks S/G CF control valve in manual control	
	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 	
	SRO	Checks the reactor tripped	NO
	RO	Maintains S/G level	Go to step 7
	RO	Controls feed flow to maintain S/G NR level - at programmed level	
	SRO	Checks NC temperature with NC pumps on stable or trending to programmed temperature	
	SRO	Checks procedure enter due to failed steam flow channel	
	SRO	Contacts I&E to repair failed channel Exit procedure	Failure will not be repaired This is a Tech Spec instrument.

Event: RN to KC Heat Exchanger Valve Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes loss of RN flow to KC HX	
	SRO	Go to AP/20 Loss of RN – Case 1	
	BOP	Checks for potential loss of LLI	
	BOP	Places idle RN train in service	<p>Starts opposite train of RN</p> <ul style="list-style-type: none"> To start 1A RN pump performs the following <ul style="list-style-type: none"> Places manual loader for 1RN-89A to 10% OPEN Starts 1A RN Pump Ensures 1RN-86A OPEN
	SRO	Determines 1B RN train malfunction	<p>The question asked is the pump malfunctioning. The answer is no.</p> <p>The crew may or may not remove the 1B RN pump from service.</p>
	SRO	Checks 1B RN pump malfunctioning	
	BOP	Checks 1B KC Pump – ON	
	BOP	Places 1RN-187B "Mode Select" switch to manual	
	BOP	Opens 1RN-187B	
	BOP	Stops 1B RN pump	
	BOP	Throttles 1RN-89A to establish desired flow while maintaining less than 16,000 gpm	
	RO	Announces occurrence on page.	
	SRO	Dispatches operators to check for loss of RN to KC HX.	1RN-190 will show closed on OAC
	BOP	Ensures Chiller in service per Enclosure 3	

Event: RN to KC Heat Exchange Valve Failure

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Swaps trains of KC per Enclosure 2	<p>Process for swapping KC</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"> 1. 1RN-40A 2. 1RN-41B 3. 1RN-43A 4. Any KC pump running • Checks both ND pumps OFF • Go to Step 19 • Ensures 1RN-187B select switch is in manual • Places 1KC-51A in the "AUTO" position • Ensure 1KC-51A opens • Starts 1A1 and 1A2 KC pumps • Aligns Reactor Bldg header to 1A train as follows: <ol style="list-style-type: none"> 1. Open 1KC-3A 2. Open 1KC-230A 3. Close 1KKC-222B 4. Close 1KC-18B • Checks both ND pumps OFF • Places 1RN-187B Mode Select switch to manual • Close 1RN-187B • Stops 1B1 and 1B2 KC pumps • Places control switch for 1KC-54B to close position
	RO	Swaps trains of NV per OP/1/A/6200/001B Enclosure 4.2 section 3.5	<p>Starts NV lube oil pump for 1A NV pump</p> <p>Starts 1A NV pump</p>

Event: RN to KC Heat Exchanger Valve Failure

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Checks both trains of RN suction – Aligned to LLI	
	BOP	Stops any RV pumps that auto started due to loss of RN.	
	SRO	Consults Tech Specs. – Should declared 3.0.3 due to “A” train D/G inoperable and “B” train RN inoperable.	

Event: Trip of 1A FWPT due to oil leak – Turbine Runback

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes oil leak on 1A FWPT	If crew does not trip the 1A FWPT then it will be tripped to get them in a runback for a short period of time
	CREW	Recognizes trip of 1A FWPT	
	SRO	Enters AP/03 Load Rejection	
	RO	Recognizes turbine not running back on load rejection signal.	<i>This is an immediate action step.</i> The RO should place turbine in manual and runback to 400-410 psig impulse pressure.
	RO	Checks control rods: <ul style="list-style-type: none"> • In auto • Moving In as required 	<i>This is an immediate action step.</i>
	BOP	Checks proper CM system operation: <ul style="list-style-type: none"> • Standby Hotwell and Condensate Booster pumps RUNNING • 1C-420 - OPEN 	BOP Should start pumps and check manual loader OPEN
	RO	Ensures impulse pressure decreasing to 400 – 410 psig	RO should have already been taking action
	RO	Checks all control banks – Aligned with Associated Bank.	
	RO	If P/R meters are less than 20% then: <ul style="list-style-type: none"> • Place control rods in manual • Check P/R meters > 5% • Stabilize reactor power between 10 and 15% 	
	SRO	Designates an operator to continuously monitor reactor power.	
	RO	Checks condenser dump valves modulating open	
	RO	Checks load rejection – due to loss of CF pump	
		At this time the second FWPT will trip and initiate and ATWS	Step in of AP/03

← type

Event: ATWS/Loss of Heat Sink

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes ATWS due to loss of both FWPTs	
	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 goes to EP/FR-S.1 and implements EP/F-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 	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% 	
	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 • If at anytime while in this procedure and S/I exists or occurs then run enclosure 3 	

Event: ATWS/Loss of Heat Sink

	Pos.	Expected Actions/ Behavior	Comments
	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% 	
	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 steamlines intact: <ul style="list-style-type: none"> • All S/G pressures – Stable or Going UP • All S/G pressurized 	
	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 	
	SRO	Calls chemistry to obtain current boron concentration	
	SRO	Refers to RP/000 Classification of Emergency	
	SRO	Return to E-0 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	
	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 	

Event: Loss of Heat Sink

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Determines from fold out page that NC System Feed and Bleed criteria have been met. They will immediately go to step 20 in the body of procedure.	
	SRO	Steps 21 to 25 should be performed quickly	These steps initiate bleed and feed
	BOP	Stops all NC pumps	
	BOP	Initiates S/I	
	BOP	Checks at least one of the following NC System feed paths as follows: <ul style="list-style-type: none"> Any NI pump – ON OR <ul style="list-style-type: none"> NV Pumps to Cold Leg Flow Indicated 	
	BOP	Establishes NC System bleed path <ul style="list-style-type: none"> Checks all Pzr PORV isolation valves – OPEN Selects OPEN on two Pzr PORVs that have an open Pzr PORV isolation valve Aligns N2 to PORVs by opening 1NI-430A and 1NI-431A Checks power to all Pzr PORV isolation valves available. 	
	BOP	Checks two Pzr PORV and associated isolation valves - OPEN	
	BOP	Places all Pzr htrs in manual and off	
	SRO	Have another operator check S/I equipment per enclosure 11	
	Crew	Maintain NC Heat Removal: <ul style="list-style-type: none"> Maintain S/I flow Maintain 2 Pzr PORV flowpaths - OPEN 	
	BOP	Resets: <ul style="list-style-type: none"> S/I Sequencers Phase A Isolation 	
	BOP	Checks containment pressure has remained less than 3 psig.	

Event: Loss of Heat Sink

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Establishes VI to containment by checking the following open: <ul style="list-style-type: none"> • 1VI-129B • 1VI-160B • 1VI-150B VI header pressure > 85 psig	
	SRO	Checks containment H2 concentration: <ul style="list-style-type: none"> • Ensures operator dispatched to stop NF AHUs • Check H2 analyzers in service 	SRO dispatches operator to place H2 analyzers in service and go to step 33.
	SRO	Checks NS pump status	Go to step 34
	SRO	Checks W/R levels >12% - NO	Go to enclosure 10 (Hot Dry S/G Flow Limits)
	RO	Reset CA modulating valves.	
	RO	Closes all CA flow control valves from MD and TD Ca pumps	
	RO	Isolates CA to S/Gs not to be fed	
	SRO	Checks T-hots – Stable or Going Down – NO	<p>If core exits T/C are going up – Then:</p> <p>When a S/G feed source is available then:</p> <ul style="list-style-type: none"> • Feed selected S/G at rate required to lower core exit T/Cs • If a CA pump is started, then throttle open CA control valves to S/G to be fed. • If any S/G with W/R level greater than 12% exists, then also feed that S/G at rate required to lower core exit T/Cs. • When feed flow established in body of procedure, and core exit T/Cs are going down, then go to step 9 in this procedure. • Go to step 36 in body of procedure.
	SRO	If T-hots are Stable or Going down the crew will do steps 6 and 7 of this enclosure and go to step 36.	
	SRO	Goes to step 36 in H.1	

Event: Loss of Heat Sink

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Continues to establish secondary heat sink in at least one S/G	CA will not be available – so they must use CM or CF.
	SRO	Should go to step 9 with CA NOT available	
	SRO	Checks all NC pumps – off	
	SRO	Checks CM system in service <ul style="list-style-type: none"> • Hotwell pumps – ON • Condensate Booster pumps – ON 	
	SRO	Reset Feedwater isolation: <ol style="list-style-type: none"> 1. Check Doghouse alarms DARK 2. Dispatch an operator to Block Feedwater isolation 3. Check if S/I has been actuated 4. Reset S/I and Sequencers Do not continue until 2 above is complete	
	SRO	Establish CF flow per enclosure 7	SRO should realize that both CF pumps are not available and go to step 15
	SRO	Directs BOP to depressurize Pzr to less than 1905 psig: <ul style="list-style-type: none"> • Checks Pzr pressure > 1905 psig • Ensure Pzr pressure is maintained above 1845 ppsig until Pzr S/I signal is blocked in step 16 • Check letdown in service 	<p>If less than 1905 psig then go to step 16</p> <p>Excess letdown should have been isolated on the S/I</p> <p>BOP will depressurize using ^{one?} on Pzr PORV to less than 1905 psig.</p> <p>Depressurize using on Pzr PORV to less than 1905 psig and maintain pressure less than 1905 psig.</p> <p>Go to step 16</p>
	BOP	Blocks Pzr S/I actuation circuit and Low Pressurizer Steamline isolation: <ul style="list-style-type: none"> • Check P-11 status light LIT • Depress block on Pzr S/I block pushbuttons • Depress block on low pressure steamline isolation block switches. 	
	SRO	Should designate an operator to continuously monitor Pzr pressure and maintain < 1905 psig per enclosure 8.	

Event: Loss of Heat Sink

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	<p>Attempt to establish feed flow from CM system:</p> <ul style="list-style-type: none"> • Check at least 2 hotwell pumps ON • Check at least 2 condensate booster pumps ON • Depressurize at least one S/G to less than 510 psig. • Checks condenser available <p>1. C-9 status light LIT</p> <p>2. MSIV on S/G to be depressurized OPEN</p> <ul style="list-style-type: none"> • Place steam pressure controller in manual • Check steam dump select in steam pressure mode • When P-12 status light is lit then place steam dumps in bypass interlock. 	<p>If, the MSIVs are closed the crew will have to use S/G PORVs to depressurize the S/Gs. They will go to step 17.i.</p> <p>If they use PORVs then:</p> <ul style="list-style-type: none"> • Ensure main steam isolation reset • Ensure S/G PORVs reset • Dump steam using S/G PORVs
	CREW	Will depressurize at least one S/G to less than 510 psig and stabilize.	
	RO	<p>Closes the following valves:</p> <ul style="list-style-type: none"> • 1CF-35AB • 1CF-30AB • 1CF-28AB • 1CF-26AB 	
	RO	<p>Place the following in manual and close:</p> <ul style="list-style-type: none"> • S/G CF control valves • S/G CF control bypass valves 	
	SRO	<p>Checks the following alarms DARK</p> <ul style="list-style-type: none"> • 1AD-5, G-6 Inner Doghouse Level • 1AD-5, H-6 Outer Doghouse Level 	
	RO	Resets feedwater isolation	

Event: Loss of Heat Sink

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Aligns feed flow as follows: <ul style="list-style-type: none">• Opens the following on S/G to be fed 1CF-126B 1CF-127B 1CF-128B 1CF-129B	
	RO	Throttle open S/B CF control bypass for S/G to be fed.	
	Crew	Checks feedwater flow to depressurized S/G -- flow indicated.	
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: Site Area 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.

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 maintenance.
- "1A" Auxiliary Feedwater Pump Tagged for PM
- Switchyard work is in progress
- "Unit has .6 gpm unidentified leakage
- Unit 2 is available for auxiliary steam
- 1EMF-33 is inoperable
- 1B S/G SM PORV is isolated due to leak

Begin load reduction to take the plant to mode 6 to begin refueling outage.
Reactor group has determined it will take 300 gallons of boric acid for the shutdown.
Insert 50 gallons of acid to begin shutdown and use rods for AFD control.
Begin load reduction at 2 MW/min.

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

Facility: McGuire		Scenario No.: 2		Op-test No.: _____	
Examiners: _____		Operators: _____			
_____		_____			
_____		_____			
Objectives: _____					

Initial Conditions: 75% Power/ "B" Train Component in service/					

Turnover: "1A" D/G Tagged/ "1A" AFW Pump Tagged/ Switchyard work is in progress/ Unit 1 has .6 gpm unidentified leakage/ 1EMF-33 inoperable/ "1B" S/G PORV isolated due to leak/ Unit 2 is available for auxiliary steam/Place second feedwater pump in service/ Increase load at 2 MW/Min					
Event No.	Malf. No.	Event Type*	Event Description		
1		C(BOP)	Pressurizer Master Failure - LOW		
2		C(RO)	CF Regulating Valve Failure		
3		I(BOP)	Loop "D" T-hot failure		
4		I(RO)	Main Steam Header Instrument Failure		
5		N	Load reduction due to Steam Generator Tube Leak		
5		R	Manual Rod Insertion		
6		M(ALL)	S/G tube leak at 40 gpm that develops into a design basis tube rupture of 425 gpm.		
			Post Major Accident Failures		
			Failure of NV valves to swap from VCT to FWST		
			Failure of Source Range to automatically re-energize		
			MSIV on Ruptured S/G Fails to close completely		
			Feedwater Isolation Fails to Actuate Automatically		

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 19

TOPIC: Nuclear Regulatory Commission Simulator Exam
Scenario 2

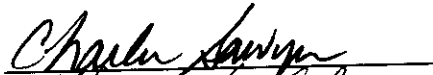
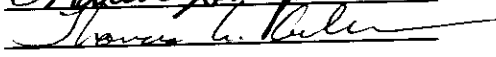
REFERENCES:

1. McGuire Technical Specifications
2. AP/1/A/5500/06 Loss of S/G Feedwater
3. AP/1/A/5500/11 Pressurizer Pressure Anomalies
4. AP/1/A/5500/14 Rod Control Malfunction
5. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
6. EP/1/A/5000/E-3 Steam Generator Tube Rupture
7. RP/O/A/5700/00 Classification of Emergency

Author:

Facility Review:

NRC Review"

March 10, 2000
Rev.1

SIMULATOR OPERATOR INSTRUCTIONS

—	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC-146	
<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"/>		(MAL) 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) SM006C	MSIV on ruptured generator fails open
<input type="checkbox"/>		(M) ISE002A (M) ISE002B	No automatic S/I both trains
<input type="checkbox"/>		(M) ISE007A (M) ISE007B	Failure of Feedwater Isolation - both trains
<input type="checkbox"/>		(M) EMF133 Set = 10	Set EMF 33 at 10
<input type="checkbox"/>		(M) EMF Set = 0	Fails EMF 73 to "0"
<input type="checkbox"/>		(M) ENB003B	Failure of Source Range N32 to Re-energize
<input type="checkbox"/>		(M) NV010B	Fails 1NV-222B to the closed position

SIMULATOR OPERATOR INSTRUCTIONS

-	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"/>	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	(MAL) ILE001 Ramp = 1200	Pressurizer Master fails to 1950 psig over 20 minutes
<input type="checkbox"/>	At direction of examiner	(MAL) IFE009A Set = 120, Ramp = 5	Normal controller fails on "A" S/G
<input type="checkbox"/>	At direction of examiner	(XMT)	"D" loop T-hot fails HIGH
<input type="checkbox"/>	At direction of examiner	(XMT) SM019 Set = 0 Ramp = 300	Fails Main Steam Header Pressure to "0"
	At direction of examiner	(M) S/G001C Sel = 50 Ramp = 120	Initiates 40 gpm tube leak on "C" steam generator
<input type="checkbox"/>		(M) S/G001C Sel = 425 Ramp = 120	Initiate once a shutdown has begun Design basis tube rupture
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

Event: Normal Controller for "A" S/G Fails Low

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> • A-3 • B-3 	Per annunciator response and AP/06 the operator will swap failed controller to an operable controller
	RO	Places Feed Regulator to Manual Restores S/G level to program level	Immediate Action step
	RO	Checks the following channel indicating the same: <ul style="list-style-type: none"> • Feed flow • Steam Flow • S/G Level 	Immediate Action step
	RO	Checks S/G CF control valve in manual control	YES
	RO	When the following are met then return affected S/G CF control to automatic <ol style="list-style-type: none"> 1. Selected control channels indicated correctly <ul style="list-style-type: none"> • Feed flow • Steam flow • S/G level 2. Affected S/G level restored to program level 3. Automatic control is desired 	
	SRO	Checks the reactor tripped	NO
	RO	Maintains S/G level	Go to step 7
	RO	Controls feed flow to maintain S/G NR level - at programmed level	
	SRO	Checks NC temperature with NC pumps on stable or trending to programmed temperature	
	SRO	Checks procedure enter due to failed controller	
	SRO	Contacts I&E to repair failed controller Exit procedure	Failure will not be repaired

Event: T hot failure

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Recognizes Unwarranted Control Rod Insertion and informs Crew. <ul style="list-style-type: none"> No turbine or reactor power excursion Tref abnormal 	Annunciator AD-6 B -10 T-ref/T-auct Abnormal
	RO	If more than one rod dropped – trip Rx	
	RO	Places CRD Bank Selector Switch to manual and verifies movement stopped	RO places Rods in Manual
	SRO	Enters AP/14 Case II, Rod Control Malfunctions and directs activities.	
	RO	Perform the following to maintain T-ave within 1 degree of programmed Tref. <ul style="list-style-type: none"> Lower turbine load or raise T-ave Or <ul style="list-style-type: none"> Borate the NC system to lower T-ave 	RO should pull rods out to maintain Tc at 557
	Ro	Announce occurrence on paging system	
	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 "D" T-ave identified Go to Enclosure 4
	SRO	Goes to Enclosure 4	
	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 	

Event: T hot failure

Time	Pos.	Expected Actions/ Behavior	Comments
	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 "D" 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>
	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 	
	SRO	Checks if failed channel has been identified	YES

Event: Pressurizer Pressure Master Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes/reports PZR pressure decreasing	
	SRO	Implements AP/11 Pzr Pressure Anomalies, Case 2 and directs activities	
	BOP	Reports Pzr Pressure decreasing	
	BOP	Determines all channels the same	
	BOP	Checks/reports Pzr PORV's Closed	
	BOP	Checks/reports Spray Valves Closed	
	BOP	Reports Pzr PORVs - closed	
	BOP	Reports Spray Valves Closed	
	SRO	Go to Step 9	
	BOP	Checks/reports NV-21A , CLOSED	
	BOP	Checks/reports Pzr A,B & D heaters ON	
	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. • AUTO broken must stay in manual
	BOP	Checks Pzr pressure going UP	
	SRO	Go to step 19	
	SRO	Ensures "Pzr PRESS REC SELECT" is on an operable channel	Failure will not be fixed
	SRO	Exits procedure	

Event: Main Steam Header Pressure Instrument Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Determines instrument failure	
	RO	RO Must <ul style="list-style-type: none"> • places both FWPTs in manual • increase speed on both FWPTs • ensures actual CF header pressure/SM header pressure on program 	
	SRO		
	SRO		

Event: S/G Tube Leakage on "C" S/G

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Report either of the following: <ul style="list-style-type: none"> • Pzr level decreasing • Pzr press decreasing • EMF 25 	
	SRO/ BOP/ RO	Refer to Ann. Response: <ul style="list-style-type: none"> • Notify RP shift • RDW shift • CT lab • Refer to AP/10 • Have operator secure drains to TB sump 	
	SRO	Go to AP/10 (Case I) S/G Tube Leakage and directs activities	
	BOP	Report Pzr Level decreasing: <ul style="list-style-type: none"> • Report NV-238 opening • Open NV-241 while maintaining 8 gpm Seal Injection Flow • Starts additional NV Pump • Reduce letdown to 45 gpm or isolate letdown <p>*If level less than 11% then:</p> <ul style="list-style-type: none"> • Manually Trip Reactor • Manually SI 	
	SRO	If primary to secondary leak is greater than 100 gpm, then trip reactor and go to E-0	Leak is < 100 gpm
	RO	Announce occurrence on page	
	SRO	If at any time while in this procedure Pzr level can not be maintained stable then perform step 1.	
	BOP	Checks Pze pressure – stable or trending to 2235 psig.	
	SRO	If NC leakage exceeds Tec Spec limits then ensure outside air pressure filter train in service.	
	SRO	Reduce load as follows: Leak rate will have increased by 60 gpd in one S/G <ul style="list-style-type: none"> • Commence controlled plant shutdown as quickly as sage plant operations permits. • If greater than 300 MW, use AP/04 	
	SRO	Implement RP/00, Classify as Notification of Unusual Event if S/D due to T.S.	

Event: S/G Tube Leakage on "C" S/G AP/04 Evaluation – Rapid Downpower

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Identify "B" S/G as having excessive leakage	AP/04 evaluation Rapid Downpower <ul style="list-style-type: none"> • Monitor foldout page • determine power reduction rate • check control rods in AUTO - YES • notify SOC of load reduction • initiate turbine load reduction • borate the NC system • check control rods moving in as required • check turbine impulse pressure > 290# • refer to RP/00 Classification of Emergency and RP/10 Immediate NRC Notification Requirements • check turbine control in AUTO • check Unit 2 aux steam available to supply header • check P/R instruments indicate power < 40% • all CF flows < 40# • Impulse pressure < 290# • HOLD point - LEAK GETS BIGGER
	SRO	When leak is greater than makeup capability, directs crew to trip reactor and initiate Safety Injection	Crew will go back to step 1 of AP/10 when Pzr level begins decreasing
	RO	Manually trips Reactor (Train A & B)	
	BOP	Manually initiates Safety Injection	

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

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to EP/E-0 and directs activities	
	SRO	Reviews Foldout page with crew	
	RO	Report Reactor Trip: <ul style="list-style-type: none"> • rod bottom lights • reactor trip breakers open • I/R amps decreasing 	
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> • TV's or GV's closed 	
	BOP	Reports ETA and ETB energized	
	RO	Reports SI status light - LIT	
	BOP	Report LOCA sequencers (A & B) actuated	
	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	Reports all Ss and St components in Group 4 NOT -LIT	Crew will have to determine that CF isolation and NV valve did not position.
	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	

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

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to EP/E-0 and directs activities	
	SRO	Reviews Foldout page with crew	
	RO	Report Reactor Trip: <ul style="list-style-type: none"> • rod bottom lights • reactor trip breakers open • I/R amps decreasing 	
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> • TV's or GV's closed 	
	BOP	Reports ETA and ETB energized	
	RO	Reports SI status light - LIT	
	BOP	Report LOCA sequencers (A & B) actuated	
	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	Reports all Ss and St components in Group 4 NOT -LIT	Crew will have to determine that CF isolation and NV valve did not position. Crew will also have to determine that Phase "A" Train "A" did not actuate.
	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	

Event: SGTR "C" S/G

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	EXAMINER CUE: • 2A RN pump is running
	RO	Checks/reports all S/G pressures > 775 psig	
	BOP	Reports Containment pressure has remained less than 3 psig	
	BOP	Report NV Pump to Cold Leg Flow gauge - indicating flow - YES • checks NC pressure < 1600 psig • checks NI pumps indicating flow - NO	Crew will ensure ND pump mini-flow valves are open
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 21	
	RO	• 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	Reports Pzr PORV & Spray Valves closed	One spray valve will be partially OPEN but the pump will be off
	BOP	Reports subcooling > 0 deg.	
	BOP	Reports all main steamlines INTACT	
	RO/ BOP	Report S/G tube rupture parameters indicate that S/G tubes NOT intact	Implements F-0 and E-3

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Implement CSF Status Trees and go to EP/E-3	
	SRO	Go to EP/E-3 and directs activities	
	SRO	Monitor foldout page	
	RO/ BOP	Identify "C" 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 	
	RO	Check S/G 1B and 1C INTACT	C is Not intact
	SRO	Dispatch operator to close valves For S/G 1C: <ul style="list-style-type: none"> • 1SA-1 • 1SA-77 	
	RO	Check blowdown isolation valves - CLOSED: <ul style="list-style-type: none"> • 1BB- 3B • 1BB- 7A 	
	BOP	Close steam drain and check "CLSD" light lit for ruptured S/Gs: <ul style="list-style-type: none"> • 1SM-95 (C SM Line Drain) 	
	RO	Close the following on ruptured S/Gs: <ul style="list-style-type: none"> • MSIV • MSIV bypass valve 	MSIV on ruptured S/G will not close. RO will close other S/G <ul style="list-style-type: none"> • MSIVs • MSIV bypass valves • steam dumps • Close SM-14, SM-15, AS-12, TL-3 • SP1 and SP1 • When cooldown is initiated in subsequent steps then use intact S/G PORVs for steam dump.
	RO	Checks ruptured S/G NR levels greater than 11% Isolates feed flow to "C" S/G <ul style="list-style-type: none"> • Closed 1CA-50B • Closed 1CA-46B 	

Event: SGTR on "C" Steam Generator

Event:	Pos.	Expected Actions/ Behavior	Comments
	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	
	SRO	Checks the following closed on ruptured S/G: <ul style="list-style-type: none"> • MSIV • MSIV bypass valve 	NO, MSIV open
	SRO	Checks ruptured S/G pressure greater than 280 psig.	

Event: STGR on "C" S/G

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Checks any NC pump running	
	SRO	When P-11 status light lit then block steamline isolation and maintain NC pressure less than 1955 psig.	
	RO	<p>Initiate a cooldown to cold shutdown Determine required core exit temperature based on lowest ruptured S/G pressure.</p> <ul style="list-style-type: none"> COND AVAILABLE FOR STEAM DUMP" status light – LIT MSIV on intact S/Gs OPEN <ul style="list-style-type: none"> Check low pressure steamline isolation – BLOCKED Check core exit T/Cs – less than required temperature. Stop NC system coodown Maintain core exit T/Cs less than required temperature. 	<p>NO</p> <ul style="list-style-type: none"> If Pzr pressure is greater than 1955 psig, then depressurize to 1900 psig using Pzr PORV. Depress "BLOCK" on low pressure steamline isolation block switches. Maintain NC pressure less than 1955 psig. Ensure Main Steam Isolation reset. Ensure S/G PORVs reset. Dump steam using all intact S/Gs PORVs at maximum rate as follows: <ol style="list-style-type: none"> 1. Close S/G PORV manual loader on ruptured S/G 2. Place intact S/G PORV manual loaders at 50% 3. Select "MANUAL" on "SM PORV MODE SELECT" 4. Adjust manual loader on intact S/G PORVs as required to control intact S/G depressurization rate at approximately 2 psig per second.
	SRO	Checks ruptured S/G pressure – stable or going up	
	SRO	Checks NC subcooling based on core exit T/Cs > than 20 degrees	

Event: STGR on "C" S/G

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Depressurizes the NC system 1. Checks ruptured S/G NR level less than 73% 2. Checks normal Pzr spray available 3. Initiates NC depressurization using maximum spray 4. Do not continue in procedure until one of the following satisfied: <ul style="list-style-type: none"> NC subcooling less than 0 degrees Pzr level greater than 76% Or <ul style="list-style-type: none"> Both of the following NC pressure less than ruptured S/G pressure Pzr level greater than 11% <ul style="list-style-type: none"> Go to step 23 	
	Crew	Checks for S/I termination criteria 1. NC subcooling greater than 0 degrees 2. Secondary heat sink 3. NC pressure – stable or going up 4. Pzr level greater than 11%	
TERMINATE SCENARIO AT DIRECTION OF CHIEF EXAMINER			

EXAMINER NOTE: Be sure SRO classifies event at end of scenario.

Classification of event: ALERT

SHIFT TURNOVER INFORMATION

UNIT 1 STATUS:

Power Level: 70% NCS [B] 805 ppm Pzr [B]: 805 ppm Xe: 2711 pcm

Power History: Return to Power after FWPT repair Core Burnup: 200 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation enclosure 4.1 step 3.92

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

"1A" Diesel Generator tagged for maintenance.
"1A" Auxiliary Feedwater pump tagged - PM
Switchyard work is in progress
Xenon is decreasing due to load increase.
Returning to 100% following repair of 1B FWPT oil leak.
Unit 2 is available for auxiliary steam.
Unit 1 has .6 gpm unidentified NC system leakage

Place second FWPT in service per OP/1/A/6250/01 step 3.2.17 and continue with load increase.
Reactor group request that you use dilution until greater than 50% power. The reactor group has calculated that it will take 1700 gallons of water to dilute to 50%. Insert the water as necessary to maintain $T_{ave}=T_{ref}$. Then use a combination of rods and dilution maintaining AFD on target.

Work Control SRO/Offsite Communicator

Thad

Unit 2 SRO

Jim

NLO's AVAILABLE

Unit 1

Aux Bldg. Robb

Turb Bldg. Fred

Extra(s) Bill, Craig, Russ, Ron

Unit 2

Aux Bldg. Joe

Turb/Service Bldg. Mike

Facility: McGuire		Scenario No.: 3		Op-test No.: _____	
Examiners: _____		Operators: _____			
_____		_____			
_____		_____			
Objectives: _____					

Initial Conditions: 40% Power/ "B" Train Components in Service					
Turnover: "1A" D/G Tagged/ "1A" AFW pump tagged/ Switchyard work in progress/ Unit 1 has .6 gpm unidentified leakage/ 1EMF inoperable/ "1B" S/G PORV isolated due to leak/ Unit 2 is available for auxiliary steam/ Place second feedwater pump in service per OP/					
Event No.	Malf. No.	Event Type*	Event Description		
1		N	Placing Second FWPT in Service		
1		R	Rod Withdrawal or Dilution		
2		I (RO)	Power Mismatch Failure		
3		I (BOP)	Pzr Pressure Channel 2 Fails HIGH		
4		C (RO)	Condenser Dump Valve Opens		
5		C (BOP)	Loss of Operating Train ETB		
6		M (ALL)	LOCA Outside Containment		
			Post Major Event Malfunctions		
			"A" Train Safety Injection Pump Fails to Start on S/I		
			"A" Reactor Trip Breaker Fails to Open Automatically		
			Two rods stuck out on reactor trip		
			The loss of ETB is a DAS at McGuire. It comprises 1% of the important core melt events.		

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

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 19


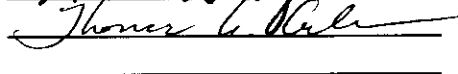
TOPIC: Nuclear Regulatory Commission Simulator Exam

Scenario 3

REFERENCES:

1. McGuire Technical Specifications
2. AP/1/A/5500/01 Steam Leak
3. AP/1/A/5500/11 Pressurizer Pressure Anomalies
4. AP/1/A/5500/14 Rod Control Malfunction
5. AP/1/A/5500/07 Loss of Electrical Power
6. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
7. EP/1/A/5000/ECA 1.2 LOCA Outside Containment
8. EP/1/A/5000/E-1 Loss of Reactor or Secondary Coolant
8. RP/O/A/5700/00 Classification of Emergency

Author:
Facility Review:
NRC Review"

March 10, 2000
Rev.1

SIMULATOR OPERATOR INSTRUCTIONS

—	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC-148	
<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) CA010 Set = F	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		(MAL) IPE001A (MAL) IPE002A	Failure of "A" Reactor Trip Breaker to OPEN automatically Must be opened locally
<input type="checkbox"/>		(M) ISE002A (M) ISE002B	No automatic S/I both trains
<input type="checkbox"/>		(MAL) NI001A	"A" Safety Injection pump fails to start on S/I
<input type="checkbox"/>		(M) IRE010C5 (M) IRE010C7	Sticks two rods out on reactor trip
<input type="checkbox"/>		(MAL) EMF133 Set = 10	1EMF-33 Failed as is
<input type="checkbox"/>		(M) EQB001B Set = 1	"B" Train D/G load sequencer stops after applying the first load group.

—	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"/>	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	(MAL) IRE002 Set = >1	Failure of Power Mismatch Circuit
<input type="checkbox"/>	At direction of examiner	(XMT) NC039 Set = 2500 Trigger 1 Activate trigger 1	Fails Pzr Pressure Channel 2 HIGH Set up for PORV NC-36 Fails Open and block valve must be closed.
<input type="checkbox"/>	At Direction of Examiner	(MAL) IDE003C Ramp = 120	Fails condenser dump valve open
<input type="checkbox"/>		(LOA) SB009 Set = 0	When asked by crew to isolate open condenser dump
<input type="checkbox"/>	At direction of examiner	(MAL) EP009B	Trips Operating Train ETB
<input type="checkbox"/>	At Direction of Examiner	(MAL) ND008D (MAL) ND011B Set = 2000	Initiates a LOCA outside containment Set both for trigger 2
<input type="checkbox"/>			When asked to open reactor trip breaker "A" LOA – IPE003 – Rack out and in if necessary
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

EVENT: Normal Operations - Load Increase

Time	Pos.	Expected Actions/ Behavior	Comments
	RO/ BOP	<p>Will perform the following steps per OP/1/A/6250/001 Encl 17 to place second FWPT in service</p> <ul style="list-style-type: none"> • Opens the high and low pressure stop valves • selects auto on LP and HP Stm for CF pump Turb on 1MC-9 • Verifies oil temp is approximately 100 degrees • Selects startup rate • raise % feedwater to 25% • slowly accelerated CF pump turbine using GV valve positioner • ensures FWPT is off turning gear • increases turbine speed until Feedwater IS light is lit • raises % startup to > 90% • maintains feedwater header pressure great enough to feed S/G but less than 1325# • place FWPT in auto per power operations OP • after 3 hours of operation closes 1TE-2 and 1TE-4 	
	RO/ BOP	Places second FWPT in auto per OP/1/A/6100/03 step 3.94	
	Crew	Continues power and load increase	
	RO	Depresses LOAD RATE pushbutton	
	RO	Selects rate of load change	
	RO	Depresses "ENTER" pushbutton	
	RO	Depresses the "REFERENCE" pushbutton	
	RO	Set in the desired load	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "GO" pushbutton	
	RO	Verify that the load starts to change at the selected rate	

Event: Normal Operations - Load Increase
Rod Withdrawal or Dilution

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Provide guidance to RO/BOP on expectations for rod withdrawal or dilution on load increase.	SRO should provide some general guidance as to using rods to maintain Tave within a pre-determined range of Tref.
	RO BOP	Will withdraw rods or dilute as necessary based on instructions from SRO	

Event: Power Mismatch Circuit Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Recognizes Unwarranted Control Rod Insertion and informs Crew. <ul style="list-style-type: none"> No turbine or reactor power excursion Power mismatch circuit abnormal 	Annunciator AD-6 B -10 T-ref/T-auct Abnormal
	RO	Places CRD Bank Selector Switch to manual and verifies movement stopped	RO places Rods in Manual Checks rod movement stopped
	SRO	Enters AP/14, Rod Control Malfunctions and directs activities.	
	RO	Performs the following as necessary to maintain T-ave within 1 degree of T-ref <ul style="list-style-type: none"> Lower turbine load or Borate NC system 	
	RO	Announce occurrence on page	
	RO	Checks "Rod Control Urgent Failure" alarm dark	
	RO	Checks the following normal: <ul style="list-style-type: none"> Turb Imp Pressure Channel 1 T-ref 1A NC loop T-ave 1B NC loop T-ave 1C NC loop T-ave 1D NC loop T-ave 	
	RO	Checks Nuclear Power Range Channels normal	
	SRO	Go to Enclosure 4	
	SRO	<ul style="list-style-type: none"> Evaluate rod movement Check the following normal 1. Turb Imp Pressure Channel 1 2. T-ref 3. 1A NC loop T-ave 4. 1B NC loop T-ave 5. 1C NC loop T-ave 6. 1D NC loop T-ave Checks to see if failed channel has been identified Exit procedure 	Power mismatch circuit is the failure SRO should notify IAE to investigate and maintain T-ave within 1 degree of T-ref by adjusting turbine load or boration/dilution of NC system.

Event: Pressurizer Pressure Channel 2 Failure with failure of a PORV to reclose

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Recognizes/reports PZR pressure decreasing	
	SRO	Implements AP/11 Pzr Pressure Anomalies, Case 2 and directs activities	
	BOP	Reports Pzr Pressure channel 2 failed HIGH and actual pressure GOING DOWN	
Critical	BOP	Checks all Pzr pressure instrument indicating the same - NO	Selects 3-2 position on Pzr Press Control Switch
Critical	BOP	Checks/reports Pzr PORV's Closed	NO, NC-36 PORV will be OPEN – BOP must close isolation valve for PORV
	BOP	Checks/reports Spray Valves	
	BOP	Report PORV OPEN – BUT Block Valve Closed	
	SRO	Checks Pzr Spray Valves closed	Go to step 9
	BOP	Checks/reports NV-21A , CLOSED	
	BOP	Checks/reports PZR heaters 1A, 1B, 1D ON	
	BOP	Checks PZR heater 1C ON	
	BOP	Checks Pzr Pressure – Going up to desired pressure -	
	SRO	Go to step 19	
	SRO	Ensures Pzr Press Rec Select is on an operable channel.	Tech Spec evaluation
			Failures will not be fixed

Event: Condenser Dump Valve Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes symptoms of a steam leak <ul style="list-style-type: none"> • T-ave decreasing • Power increasing 	
	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 – 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 atmospheric dump valves – CLOSED • 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.
	SRO	Exits procedure when leak is isolated.	

Event: Loss of Operating Train ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes loss of operating train "ETB"	
	SRO	Checks bus energized and sequencer applying loads.	The diesel will start but will not automatically apply all loads. SRO will go to step 3.
	BOP	Isolates all letdown paths	
	BOP	Starts 1A RN pump <ul style="list-style-type: none"> Place manual loader for 1RN-89A to 10% open Starts 1A RN pump 	
	BOP	Starts opposite train KC pumps <ul style="list-style-type: none"> Places 1KC-51A to AUTO Starts KC pumps one at a time Ensures the following are open <ol style="list-style-type: none"> 1KC-3A 1KC-230A 1KC-394A 1KC-345A Ensures KC flow is less than 4000 gpm per operating KC pump 	
	BOP	Closes 1RN-43A	
	BOP	Restores charging flow: <ul style="list-style-type: none"> Fully open 1NV-241 Place 1NV-238 in manual and close Start 1A NV pump Slowly restore seal injection <ol style="list-style-type: none"> Throttle open 1NV-238 Throttle close 1NV-241 	
	SRO	Notifies Unit 2 RO to start 2A RN pump	
	SRO	Checks B/O on 1ETA	NO, go to step 23
	BOP	Checks 1RN-86A – OPEN	
	SRO	Dispatches operator to close: <ul style="list-style-type: none"> 1KC-228B 1KC-18B 	
	SRO	Checks 1B ND train not in service	Go to step 31

Event: Loss of Operating Train ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Checks normal letdown in service prior to B/O	
	SRO	Has available operator place letdown in service per AP 12 Go to step 38	
	RO	Checks 1A RN pump - ON	
	SRO	Checks "B" D/G - ON	
	SRO	Checks 1"B" RN pump - ON	BOP will: • Start 1B RN pump
	SRO	Notifies Unit 2 RO to start 2A RN pump	Examiner cue: 2A RN pump is running
	RO	Announces occurrence on page	
	SRO	Checks D/G on bus that was blacked out - YES	
	SRO	Checks bus energized and sequencer applying loads - NO	Go to enclosure 1 – Manual loading of bus
	SRO	Ensures S/I reset	
	SRO	Ensures 1ETA energized from offsite power and goes to step 15	
	SRO	Checks 1ETB energized from offsite power - NO	RNO go to step 17
	SRO	Checks 1ETB energized from D/G – YES Sequencer applying loads - NO	Only the first load group will be applied go to step 25

Event: Loss of Operating Train ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Observes the following: <ul style="list-style-type: none"> • continuous load on D/G should not exceed 4000 KW • maximum load on D/G should not exceed 4400 for 2 hours in any 24 hours • voltage and frequency should be allowed to stabilize before applying next load group. 	
	BOP	Checks the following dark: <ul style="list-style-type: none"> • ELXB STD-BY BKR CLOSED • ELXD STD-BY BKR CLOSED 	
	SRO	Direct Loading of ETB as required: <ul style="list-style-type: none"> • 1ELXB Fdr Breaker – CLOSED • 1B NV pump – ON • EVCB Batt Charger – ON • EVCD Batt Charger – ON • 1ELXD Fdr Breaker – Closed • Ensure 1KC-54B – IN AUTO • 1B1 KC pump – ON • 1B2 KC pump – ON • suction and discharge flowpath available to RN pump • close 1RN-41B • 1B RN pump – ON • Ensure the following OPEN – 1RN-171B & 1RN-174B • 1B CA pump • Align RN per enclosure 4 	
	SRO	Will return to body of procedure.	
		At this point the LOCA outside containment will begin.	

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Report either of the following: <ul style="list-style-type: none"> • Pzr level decreasing • Pzr press decreasing • Containment Vent Isol (EMF39) • "Ice Cond Doors Open" Annunciator 	
	SRO	Go to AP/10 (Case II) NC System Leakage and directs activities	
	BOP	Report Pzr Level decreasing: <ul style="list-style-type: none"> • Report NV-238 opening • Open NV-241 while maintaining 6 gpm Seal Injection Flow • Starts additional NV Pump • Reduce letdown to 45 gpm or isolate letdown <p>*If Pzr level less than 11% then:</p> <ul style="list-style-type: none"> • Manually Trip Reactor • Manually SI 	
	Crew	Returns to step 1 if Pzr level can not be maintained.	
	Crew	Isolated leak if location is known	
	BOP	Reports Pzr Pressure stable or trending to 2235 psig	
	RO	Reports Main Steam line is INTACT <ul style="list-style-type: none"> • Reactor power at turbine power • NC loop T-Ave is stable 	
	SRO	When leak is determined greater than makeup capability, directs crew to trip reactor and initiate Safety Injection	
	RO	Manually trips Reactor (Train A & B)	"A" reactor trip breaker will not open
	BOP	Manually initiates Safety Injection both trains	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to EP/E-0 and directs activities	
	SRO	Reviews Foldout page with crew	
	RO	Report Reactor Trip: <ul style="list-style-type: none"> rod bottom lights reactor trip breakers open I/R amps decreasing 	TWO rods will be stuck
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> TV's or GV's closed 	
	BOP	Reports ETA and ETB energized	
	RO	Reports SI status light - LIT	
	BOP	Report LOCA sequencers (A & B) actuated	
	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	Reports all Ss and St components in Group 4 NOT -LIT	"A" NI pump does not automatically start
	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	

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	EXAMINER CUE: • 2A RN pump is running
	RO	Checks/reports all S/G pressures > 775 psig	
	BOP	Reports Containment pressure has remained less than 3 psig	
	BOP	Report NV Pump to Cold Leg Flow gauge - indicating flow - YES • checks NC pressure < 1600 psig • checks NI pumps indicating flow	"A" NI pump did not start on S/I. Should be manually started. ND pumps start and trip
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 21	
	RO	• 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	Reports Pzr PORV & Spray Valves closed	One PORV will be open but isolated
	BOP	Reports subcooling > 0 deg.	
	BOP	Reports all main steamlines INTACT	
	RO/ BOP	Report S/G tube rupture parameters indicate that S/G tubes intact	

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	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	Checks S/I termination criteria NOT met	Go to step 34
	SRO	Implement F-0 CSFST	
	RO	Checks S/G levels - normal	
	BOP	Checks secondary radiation normal	
	BOP	Checks auxiliary building radiation: <ul style="list-style-type: none"> • Area monitor EMFs – NOT normal • EMF - 41 	SRO will go to ECA 1.2 LOCA Outside Containment

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Implement CSF Status Trees and go to ECA 1.2	
	SRO	Go to ECA1.2 and directs activities	
	SRO	Checks for proper valve alignment. The following valves closed: <ul style="list-style-type: none"> • 1ND-1B • 1ND-2AC • 1NI-183B • 1NI-121A • 1NI-152B • 1NV-840A 	
	Crew	Try to identify and isolate leak: <ul style="list-style-type: none"> • Dispatch operator to remove tag and close breaker for 1NI-173A • close 1NI-173A • check NC pressure – GOING UP • Dispatch operator to remove tag and close breaker for 1NI-178B • check pressure - GOING UP Isolate NI header to cold legs as follows: <ul style="list-style-type: none"> • Check the following OPEN: <ol style="list-style-type: none"> 1. 1NI-115B 2. 1NI-144B 3. 1NI-147B 	<p>Pressure will not be going UP</p> <p>Pressure will not be going UP</p> <p>After a few minutes pressure should start going up</p>
	SRO	Checks if break is isolated: <ul style="list-style-type: none"> • NC pressure – GOING UP • Initiate actions as necessary to complete isolation of leak • Go to EP – E-1 Loss of Reactor or Secondary Coolant. 	

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Monitor foldout page	
	SRO	Checks main steamlines intact: <ul style="list-style-type: none">• All S/G pressures – stable or going up• All S/Gs pressurized	
	RO	Controls intact S/G levels between 11% and 50%	
	SRO	Checks secondary EMFs normal	
	SRO	Checks Pzr PORVs and isolation valves: <ul style="list-style-type: none">• Power to all Pzr PORVs isolation valves available• All Pzr PORVs Closed• At least one Pzr PRV isolation valve OPEN	
	CREW	Checks S/I termination criteria: <ul style="list-style-type: none">• Subcooling greater than 0 degrees• Secondary heat sink• NC pressure – stable or going up• Pzr level greater than 11%	When termination criteria is met then go to EP.ES 1.1
	SRO	Go to EP/ES 1.1 Safety Injection Termination	
TERMINATE SCENARIO AT DIRECTION OF CHIEF EXAMINER			

EXAMINER NOTE: Be sure SRO classifies event at end of scenario.**Classification of event: ALERT**

SHIFT TURNOVER INFORMATION

UNIT 1 STATUS:

Power Level: 40% NCS [B] 805 ppm Pzr [B]: 805 ppm Xe: OAC

Power History: Return to Power Core Burnup: 200 EFPDs

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation enclosure 4.1 step 3.92

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

"1A" Diesel Generator tagged for maintenance.
"1A" Auxiliary Feedwater pump tagged for oil change - PM
Switchyard work is in progress.
Returning to 100% after load decrease to extend core.
Unit 2 is available for auxiliary steam.
"B" S/G PORV leaking and isolated.
Unit has .6 gpm unidentified leakage.

Place second FWPT in service per OP/1/A/6250/01 step 3.2.17 and continue with load increase. Reactor group request that you use dilution until greater than 50% power. The reactor group has calculated that it will take 1700 gallons of water to dilute to 50%. Insert the water as necessary to maintain T-ave=T-ref. Then use a combination of rods and dilution maintaining AFD on target.

Work Control SRO/Offsite Communicator

Thad

Unit 2 SRO

Jim

NLO's AVAILABLE

Unit 1

Aux Bldg. Robb

Turb Bldg. Fred

Extra(s) Bill, Craig, Russ, Ron

Unit 2

Aux Bldg. Joe

Turb/Service Bldg. Mike

PROGRAM: McGuire Operations Training

MODULE: Initial License Operator Training Class 19

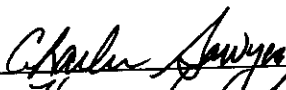
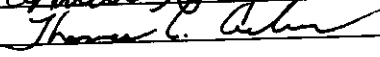
TOPIC: Nuclear Regulatory Commission Simulator Exam

Scenario 3 For SROU-5

REFERENCES:

1. McGuire Technical Specifications
2. AP/1/A/5500/01 Steam Leak
3. AP/1/A/5500/07 Loss of Electrical Power
4. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
5. EP/1/A/5000/ECA 1.2 LOCA Outside Containment
6. EP/1/A/5000/E-1 Loss of Reactor or Secondary Coolant
7. RP/O/A/5700/00 Classification of Emergency

Author:
Facility Review:
NRC Review"

March 15, 2000
Rev.0

SIMULATOR OPERATOR INSTRUCTIONS

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC-148	
<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) CA010 Set = F	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		(MAL) IPE001A (MAL) IPE002A	Failure of "A" Reactor Trip Breaker to OPEN automatically Must be opened locally
<input type="checkbox"/>		(M) ISE002A (M) ISE002B	No automatic S/I both trains
<input type="checkbox"/>		(MAL) NI001A	"A" Safety Injection pump fails to start on S/I
<input type="checkbox"/>		(M) IRE010C5 (M) IRE010C7	Sticks two rods out on reactor trip
<input type="checkbox"/>		(MAL) EMF133 Set = 10	1EMF-33 Failed as is
<input type="checkbox"/>		(M) EQB001B Set = 1	"B" Train D/G load sequencer stops after applying the first load group.

	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"/>	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		
<input type="checkbox"/>	At direction of examiner		
<input type="checkbox"/>	At Direction of Examiner	(MAL) IDE003C Ramp = 120	Fails condenser dump valve open
<input type="checkbox"/>		(LOA) SB009 Set = 0	When asked by crew to isolate open condenser dump
<input type="checkbox"/>	At direction of examiner	(MAL) EP009B	Trips Operating Train ETB
<input type="checkbox"/>	At Direction of Examiner	(MAL) ND008D (MAL) ND011B Set = 2000	Initiates a LOCA outside containment Set both for trigger 2
<input type="checkbox"/>			When asked to open reactor trip breaker "A" LOA – IPE003 – Rack out and in if necessary
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

EVENT: Normal Operations - Load Increase

Time	Pos.	Expected Actions/ Behavior	Comments
	RO/ BOP	<p>Will perform the following steps per OP/1/A/6250/001 Encl 17 to place second FWPT in service</p> <ul style="list-style-type: none"> • Opens the high and low pressure stop valves • selects auto on LP and HP Stm for CF pump Turb on 1MC-9 • Verifies oil temp is approximately 100 degrees • Selects startup rate • raise % feedwater to 25% • slowly accelerated CF pump turbine using GV valve positioner • ensures FWPT is off turning gear • increases turbine speed until Feedwater IS light is lit • raises % startup to > 90% • maintains feedwater header pressure great enough to feed S/G but less than 1325# • place FWPT in auto per power operations OP • after 3 hours of operation closes 1TE-2 and 1TE-4 	
	RO/ BOP	Places second FWPT in auto per OP/1/A/6100/03 step 3.94	
	Crew	Continues power and load increase	
	RO	Depresses LOAD RATE pushbutton	
	RO	Selects rate of load change	
	RO	Depresses "ENTER" pushbutton	
	RO	Depresses the "REFERENCE" pushbutton	
	RO	Set in the desired load	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "GO" pushbutton	
	RO	Verify that the load starts to change at the selected rate	

EVENT: Normal Operations - Load Increase

Time	Pos.	Expected Actions/ Behavior	Comments
	RO/ BOP	<p>Will perform the following steps per OP/1/A/6250/001 Encl 17 to place second FWPT in service</p> <ul style="list-style-type: none"> • Opens the high and low pressure stop valves • selects auto on LP and HP Stm for CF pump Turb on 1MC-9 • Verifies oil temp is approximately 100 degrees • Selects startup rate • raise % feedwater to 25% • slowly accelerated CF pump turbine using GV valve positioner • ensures FWPT is off turning gear • increases turbine speed until Feedwater IS light is lit • raises % startup to > 90% • maintains feedwater header pressure great enough to feed S/G but less than 1325# • place FWPT in auto per power operations OP • after 3 hours of operation closes 1TE-2 and 1TE-4 	
	RO/ BOP	Places second FWPT in auto per OP/1/A/6100/03 step 3.94	
	Crew	Continues power and load increase	
	RO	Depresses LOAD RATE pushbutton	
	RO	Selects rate of load change	
	RO	Depresses "ENTER" pushbutton	
	RO	Depresses the "REFERENCE" pushbutton	
	RO	Set in the desired load	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "GO" pushbutton	
	RO	Verify that the load starts to change at the selected rate	

Event: Normal Operations - Load Increase
Rod Withdrawal or Dilution

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Provide guidance to RO/BOP on expectations for rod withdrawal or dilution on load increase.	SRO should provide some general guidance as to using rods to maintain Tave within a pre-determined range of Tref.
	RO BOP	Will withdraw rods or dilute as necessary based on instructions from SRO	

Event: Condenser Dump Valve Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	CREW	Recognizes symptoms of a steam leak <ul style="list-style-type: none"> • T-ave decreasing • Power increasing 	
	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 – 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 atmospheric dump valves – CLOSED • 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.
	SRO	Exits procedure when leak is isolated.	

Event: Loss of Operating Train ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Recognizes loss of operating train "ETB"	
	SRO	Checks bus energized and sequencer applying loads.	The diesel will start but will not automatically apply all loads. SRO will go to step 3.
	BOP	Isolates all letdown paths	
	BOP	Starts 1A RN pump <ul style="list-style-type: none"> Place manual loader for 1RN-89A to 10% open Starts 1A RN pump 	
	BOP	Starts opposite train KC pumps <ul style="list-style-type: none"> Places 1KC-51A to AUTO Starts KC pumps one at a time Ensures the following are open <ol style="list-style-type: none"> 1KC-3A 1KC-230A 1KC-394A 1KC-345A Ensures KC flow is less than 4000 gpm per operating KC pump 	
	BOP	Closes 1RN-43A	
	BOP	Restores charging flow: <ul style="list-style-type: none"> Fully open 1NV-241 Place 1NV-238 in manual and close Start 1A NV pump Slowly restore seal injection <ol style="list-style-type: none"> Throttle open 1NV-238 Throttle close 1NV-241 	
	SRO	Notifies Unit 2 RO to start 2A RN pump	
	SRO	Checks B/O on 1ETA	NO, go to step 23
	BOP	Checks 1RN-86A – OPEN	
	SRO	Dispatches operator to close: <ul style="list-style-type: none"> 1KC-228B 1KC-18B 	
	SRO	Checks 1B ND train not in service	Go to step 31

Event: Loss of Operating Train ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Checks normal letdown in service prior to B/O	
	SRO	Has available operator place letdown in service per AP 12 Go to step 38	
	RO	Checks 1A RN pump - ON	
	SRO	Checks "B" D/G - ON	
	SRO	Checks 1"B" RN pump - ON	BOP will: • Start 1B RN pump
	SRO	Notifies Unit 2 RO to start 2A RN pump	Examiner cue: 2A RN pump is running
	RO	Announces occurrence on page	
	SRO	Checks D/G on bus that was blacked out - YES	
	SRO	Checks bus energized and sequencer applying loads - NO	Go to enclosure 1 – Manual loading of bus
	SRO	Ensures S/I reset	
	SRO	Ensures 1ETA energized from offsite power and goes to step 15	
	SRO	Checks 1ETB energized from offsite power - NO	RNO go to step 17
	SRO	Checks 1ETB energized from D/G – YES Sequencer applying loads - NO	Only the first load group will be applied go to step 25

Event: Loss of Operating Train ETB

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Observes the following: <ul style="list-style-type: none"> continuous load on D/G should not exceed 4000 KW maximum load on D/G should not exceed 4400 for 2 hours in any 24 hours voltage and frequency should be allowed to stabilize before applying next load group. 	
	BOP	Checks the following dark: <ul style="list-style-type: none"> ELXB STD-BY BKR CLOSED ELXD STD-BY BKR CLOSED 	
	SRO	Direct Loading of ETB as required: <ul style="list-style-type: none"> 1ELXB Fdr Breaker – CLOSED 1B NV pump – ON EVCB Batt Charger – ON EVCD Batt Charger – ON 1ELXD Fdr Breaker – Closed Ensure 1KC-54B – IN AUTO 1B1 KC pump – ON 1B2 KC pump – ON suction and discharge flowpath available to RN pump close 1RN-41B 1B RN pump – ON Ensure the following OPEN – 1RN-171B & 1RN-174B 1B CA pump Align RN per enclosure 4 	
	SRO	Will return to body of procedure.	
		At this point the LOCA outside containment will begin.	

{PRIVATE }Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Report either of the following: <ul style="list-style-type: none"> • Pzr level decreasing • Pzr press decreasing • Containment Vent Isol (EMF39) • "Ice Cond Doors Open" Annunciator 	
	SRO	Go to AP/10 (Case II) NC System Leakage and directs activities	
	BOP	Report Pzr Level decreasing: <ul style="list-style-type: none"> • Report NV-238 opening • Open NV-241 while maintaining 6 gpm Seal Injection Flow • Starts additional NV Pump • Reduce letdown to 45 gpm or isolate letdown *If Pzr level less than 11% then: <ul style="list-style-type: none"> • Manually Trip Reactor • Manually SI 	
	Crew	Returns to step 1 if Pzr level can not be maintained.	
	Crew	Isolated leak if location is known	
	BOP	Reports Pzr Pressure stable or trending to 2235 psig	
	RO	Reports Main Steam line is INTACT <ul style="list-style-type: none"> • Reactor power at turbine power • NC loop T-Ave is stable 	
	SRO	When leak is determined greater than makeup capability, directs crew to trip reactor and initiate Safety Injection	
	RO	Manually trips Reactor (Train A & B)	"A" reactor trip breaker will not open
	BOP	Manually initiates Safety Injection both trains	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to EP/E-0 and directs activities	
	SRO	Reviews Foldout page with crew	
	RO	Report Reactor Trip: <ul style="list-style-type: none"> • rod bottom lights • reactor trip breakers open • I/R amps decreasing 	TWO rods will be stuck
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> • TV's or GV's closed 	
	BOP	Reports ETA and ETB energized	
	RO	Reports SI status light - LIT	
	BOP	Report LOCA sequencers (A & B) actuated	
	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	Reports all Ss and St components in Group 4 NOT -LIT	"A" NI pump does not automatically start
	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	

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	EXAMINER CUE: • 2A RN pump is running
	RO	Checks/reports all S/G pressures > 775 psig	
	BOP	Reports Containment pressure has remained less than 3 psig	
	BOP	Report NV Pump to Cold Leg Flow gauge - indicating flow - YES • checks NC pressure < 1600 psig • checks NI pumps indicating flow	"A" NI pump did not start on S/I. Should be manually started. ND pumps start and trip
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 21	
	RO	• 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	Reports Pzr PORV & Spray Valves closed	One PORV will be open but isolated
	BOP	Reports subcooling > 0 deg.	
	BOP	Reports all main steamlines INTACT	
	RO/ BOP	Report S/G tube rupture parameters indicate that S/G tubes intact	

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	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	Checks S/I termination criteria NOT met	Go to step 34
	SRO	Implement F-0 CSFST	
	RO	Checks S/G levels - normal	
	BOP	Checks secondary radiation normal	
	BOP	Checks auxiliary building radiation: <ul style="list-style-type: none"> • Area monitor EMFs – NOT normal • EMF - 41 	SRO will go to ECA 1.2 LOCA Outside Containment

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Implement CSF Status Trees and go to ECA 1.2	
	SRO	Go to ECA1.2 and directs activities	
	SRO	Checks for proper valve alignment. The following valves closed: <ul style="list-style-type: none"> • 1ND-1B • 1ND-2AC • 1NI-183B • 1NI-121A • 1NI-152B • 1NV-840A 	
	Crew	Try to identify and isolate leak: <ul style="list-style-type: none"> • Dispatch operator to remove tag and close breaker for 1NI-173A • close 1NI-173A • check NC pressure – GOING UP • Dispatch operator to remove tag and close breaker for 1NI-178B • check pressure - GOING UP Isolate NI header to cold legs as follows: <ul style="list-style-type: none"> • Check the following OPEN: <ol style="list-style-type: none"> 1. 1NI-115B 2. 1NI-144B 3. 1NI-147B 	<p>Pressure will not be going UP</p> <p>Pressure will not be going UP</p> <p>After a few minutes pressure should start going up</p>
	SRO	Checks if break is isolated: <ul style="list-style-type: none"> • NC pressure – GOING UP • Initiate actions as necessary to complete isolation of leak • Go to EP – E-1 Loss of Reactor or Secondary Coolant. 	

Event: LOCA Outside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Monitor foldout page	
	SRO	Checks main steamlines intact: <ul style="list-style-type: none"> • All S/G pressures – stable or going up • All S/Gs pressurized 	
	RO	Controls intact S/G levels between 11% and 50%	
	SRO	Checks secondary EMFs normal	
	SRO	Checks Pzr PORVs and isolation valves: <ul style="list-style-type: none"> • Power to all Pzr PORVs isolation valves available • All Pzr PORVs Closed • At least one Pzr PRV isolation valve OPEN 	
	CREW	Checks S/I termination criteria: <ul style="list-style-type: none"> • Subcooling greater than 0 degrees • Secondary heat sink • NC pressure – stable or going up • Pzr level greater than 11% 	When termination criteria is met then go to EP.ES 1.1
	SRO	Go to EP/ES 1.1 Safety Injection Termination	
TERMINATE SCENARIO AT DIRECTION OF CHIEF EXAMINER			

EXAMINER NOTE: Be sure SRO classifies event at end of scenario.

Classification of event: ALERT

SHIFT TURNOVER INFORMATION

UNIT 1 STATUS:

{PRIVATE 40% NCS [B] 805 ppm Pzr [B]: 805 ppm Xe: OAC
}Power Level: _____

{PRIVATE Return to Power Core Burnup: 200 EFPDs
}Power History: _____

CONTROLLING PROCEDURE: OP/1/A/6100/03 Controlling Procedure for Unit Operation enclosure 4.1
step 3.92

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

"1A" Diesel Generator tagged for maintenance.
"1A" Auxiliary Feedwater pump tagged for oil change - PM
Switchyard work is in progress.
Returning to 100% after load decrease to extend core.
Unit 2 is available for auxiliary steam.
"B" S/G PORV leaking and isolated.
Unit has .6 gpm unidentified leakage.

Place second FWPT in service per OP/1/A/6250/01 step 3.2.17 and continue with load increase.
Reactor group request that you use dilution until greater than 50% power. The reactor group has
calculated that it will take 1700 gallons of water to dilute to 50%. Insert the water as necessary to
maintain $T_{ave}=T_{ref}$. Then use a combination of rods and dilution maintaining AFD on target.

Work Control SRO/Offsite Communicator

Thad

Unit 2 SRO

Jim

NLO's AVAILABLE

Unit 1

Aux Bldg. Robb

Turb Bldg. Fred

Extra(s) Bill, Craig, Russ, Ron

Unit 2

Aux Bldg. Joe

Turb/Service Bldg. Mike

Facility: McGuire		Scenario No.: Spare		Op-test No.: _____	
Examiners: _____		Operators: _____			
_____		_____			
_____		_____			
Objectives: _____					
Initial Conditions: 70% Power/ Increasing Load/ "B" Train Component in service					
Turnover: "A" D/G inoperable/ "A" CA pump tagged/ Switchyard work in progress/ Unit 1 has .6 gpm unidentified leakage/ 1EMF-33 inoperable/ "1B" SG SM PORV isolated due to leak/ Unit 2 is available for auxiliary steam/ Begin load increase to 100%.					

Event No.	Malf. No.	Event Type*	Event Description
1		N	Load Increase
1		R	Rod Withdrawal/Dilution
2		I (BOP)	Letdown Back pressure Instrument Failure
3		C (RO)	Steam Generator Reg. Valve Failure
4		C (BOP)	Charging Line Leak
5		I (RO)	T-ref Failure
6		M (ALL)	Steam Leak becomes Steamline Break Inside Containment
			Post Major Event Malfunctions
			No Auto Main Steam Isolation - done manually
			Small Tube Leak on Faulted Steam Generator
			Train "A" Phase "B" does not automatically actuate
			No automatic safety injection

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

PROGRAM: McGuire Operations Training

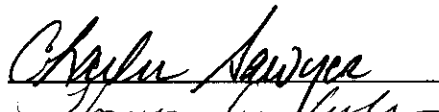
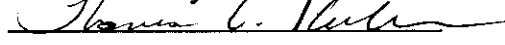
MODULE: Initial License Operator Training Class 19

TOPIC: Nuclear Regulatory Commission Simulator Exam
Scenario Spare

REFERENCES:

1. McGuire Technical Specifications
2. AP/1/A/5500/06 Loss of S/G Feedwater
3. AP/1/A/5500/12 Loss of Letdown, Charging or Seal Injection
4. AP/1/A/5500/14 Rod Control Malfunction
5. AP/1/A/5500/10 NC System Leakage Within Capacity of Both Charging Pumps
5. EP/1/A/5000/E-0 Reactor Trip or Safety Injection
6. EP/1/A/5000/E-2 Faulted Steam Generator Isolation
7. EP/1/A/5000/E-3 Steam Generator Tube Rupture
8. RP/O/A/5700/00 Classification of Emergency

Author:
Facility Review:
NRC Review"

March 10, 2000
Rev.1

SIMULATOR OPERATOR INSTRUCTIONS

—	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	Sim. Setup	Rod Step On	
<input type="checkbox"/>		IC-144	
<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 = Racked Out	Rackout breaker for "1A" Auxiliary Feedwater Pump
<input type="checkbox"/>		(MAL) ISE006A (MAL) ISE006B Block auto	Blocks auto main steam isolation
<input type="checkbox"/>		(MAL) ISE004A Block auto	Failure of Phase "B" train "A" to actuate automatically
<input type="checkbox"/>			

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>		(M) EMF133 Set – AS IS	EMF – 33 False reading
		(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) NV030 Set = 0	Fails NV letdown back pressure regulator – causes a loss of letdown
<input type="checkbox"/>	At direction of examiner	(MAL) IFE007B Set = 0	Steam Generator Regulating Valve Failure
<input type="checkbox"/>	At direction of examiner	(MAL) NV008B/C	Initiates leak on charging line

	Bench Mark	ACTIVITY	DESCRIPTION
<input type="checkbox"/>	At direction of examiner	(MAL) IRE001 Set = 557	T-ref Failure
<input type="checkbox"/>	At direction of examiner	(MAL) SM007D Set = 3e3 Ramp 300	Initiates Steam Leak
<input type="checkbox"/>		(MAL) SM007D Set = 4e6	Initiates Steam Line Break
		(MAL) SM001D Set = 200	Initiates small steam generator tube leak
<input type="checkbox"/>	Terminate the scenario upon direction of Chief Examiner		

EVENT: Normal Operations - Load Increase
Turbine Load Increase

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO RO	Notifies SOC of load increase	
	SRO RO	Increases load per OP/1/A/6300/001A and OP/1/A/6100/03 Determines load changing rate	
	RO	Depress the "LOAD RATE" pushbutton	
	RO	Set the selected rate of load change in the "Variable Display" window	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "REFERENCE" pushbutton	
	RO	Set in the desired load	
	RO	Depress the "ENTER" pushbutton	
	RO	Depress the "GO" pushbutton	
	RO	Verify that the load starts to change at the selected rate	

Event: Normal Operations - Load Increase
Rod Withdrawal

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Provide guidance to RO on expectations for rod withdrawal on load increase. <ul style="list-style-type: none"> maintains control rods within insertion limits AFD within target band 	SRO should provide some general guidance as to using rods to maintain Tave within a pre-determined range of Tref.
	RO	Will withdraw rods as necessary based on instructions from SRO	
	BOP	Will dilute NC system per guidance provided	

Event: Letdown Back Pressure Instrument Failure

	Pos.	Expected Actions/ Behavior	Comments
	SRO	Enters AP/12 Loss of Letdown, Charging or Seal Injection	
	BOP	On a loss of letdown ensure the following closed: <ul style="list-style-type: none"> • 1NV-458A • 1NV-457A • 1NV-35A 	Immediate action step
	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 and power or temperature changes in progress	
	RO	Announces occurrence on page	
	BOP	Checks "1B" NV pump - ON	
	BOP	Checks to following NV pump parameters stable: <ul style="list-style-type: none"> • Motor AMPs • Charging header pressure • Charging flow 	
	BOP	Checks seal injection flow parameters: <ul style="list-style-type: none"> • Seal flow to each NC pump > 6 gpm • Seal Water Inj Filter Hi D/P alarm - DARK 	
	SRO	IF this AP entered due to loss of letdown only, then go to step 35.	SRO will go to step 35 in this AOP
	BOP	Ensures "NC Sys M/U Controller" in AUTO	
	BOP	Ensures charging flow going down to maintain Pzr at program level	
	SRO	NOTE: A failure of the letdown pressure instrument may cause loss of letdown.	
	BOP	Checks "Letdn Relief Hi Temp" alarm has remained dark	No, crew should evaluate note prior to step 37.
	BOP	Checks 1NV-21A - closed	

Event: Letdown Backpressure Instrument Failure

	Pos.	Expected Actions/ Behavior	Comments
	BOP	Checks Pzr heater group supply breakers – closed YES	
	BOP	Checks the following OPEN <ul style="list-style-type: none"> • 1NV-2A • 1NV-2A 	NO, go to step 42
	SRO	Checks to see if immediate restoration of normal letdown is possible <ul style="list-style-type: none"> • Both NV 1 & 2 open in the past 30 minutes • Orifice isolation valves closed before or at the same time as NV 1 & 2. 	Yes, go to step 46.
	BOP	Establish normal letdown <ol style="list-style-type: none"> 1. Ensures 1NV-459 is closed 2. Place 1NV-124 in manual between 10-20% open 3. Establish cooling to Regenerative Hx by performing the following concurrently: <ul style="list-style-type: none"> • Throttle open 1NV-238 • Throttle 1NV-241 to establish approximately 8 gpm seal injection 4. Check the following OPEN <ul style="list-style-type: none"> • 1NV-1A • 1NV-2A 5. Open letdown line isolation valves: <ul style="list-style-type: none"> • 1NV-7B • 1NV-1A • 1NV-2A • 1NV-35A 1. Establish desired letdown rate by completing the following concurrently: <ul style="list-style-type: none"> • Slowly throttle open 1NV-459 • Adjust 1NV-124 to maintain letdown pressure between 250 and 350 psig. 2. Do not continue until desired flow rate is established. 3. Adjust charging flow as desired 4. Crew may stay on variable orifice or swap to 75 gpm orifice. 	Crew should determine normal letdown control is not available and establish excess letdown. <ol style="list-style-type: none"> 1. Opens the following <ul style="list-style-type: none"> • 1KC-315 • 1KC-305 2. Places 1NV-27B to VCT position 3. Opens and closes 1NV-26 4. Checks to following OPEN <ul style="list-style-type: none"> • 1NV-94 • 1NV-95 5. Opens 1NV-24 and 1NV-25 6. Slowly opens 1NV-26 7. Notifies chemistry that excess letdown is in service.
	SRO	End of Procedure	

Event: Feedwater Reg Valve for "B" S/G Fails

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Refer to annunciator responses <ul style="list-style-type: none"> • A-3 • B-3 	Per annunciator response and AP/06 the operator will swap failed channel to operable channel
	RO	Places Feed Regulator to Manual Restores S/G level to program level	Immediate Action step
	RO	Checks the following channel indicating the same: <ul style="list-style-type: none"> • Feed flow • Steam Flow • S/G Level 	Immediate Action step
	RO	Checks S/G CF control valve in manual control	YES
	RO	When the following are met then return affected S/G CF control to automatic <ol style="list-style-type: none"> 1. Selected control channels indicated correctly <ul style="list-style-type: none"> • Feed flow • Steam flow • S/G level 2. Affected S/G level restored to program level 3. Automatic control is desired 	
	SRO	Checks the reactor tripped	NO
	RO	Maintains S/G level	Go to step 7
	RO	Controls feed flow to maintain S/G NR level - at programmed level	
	SRO	Checks NC temperature with NC pumps on stable or trending to programmed temperature	
	SRO	Checks procedure enter due to failed controller	
	SRO	Contacts I&E to repair failed controller Exit procedure	Failure will not be repaired

Event: NC System Leakage – Charging Line Leak AP-10 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Report either of the following: <ul style="list-style-type: none"> • Pzr level decreasing • Pzr press decreasing • Containment Vent Isol (EMF39) • "Ice Cond Doors Open" Annunciator 	
	SRO	Go to AP/10 (Case II) NC System Leakage and directs activities	
	BOP	Report Pzr Level decreasing: <ul style="list-style-type: none"> • Report NV-238 opening • Open NV-241 while maintaining 6 gpm Seal Injection Flow • Starts alternate NV Pump • Reduce letdown to 45 gpm or isolate letdown <p>*If Pzr level less than 11% then:</p> <ul style="list-style-type: none"> • Manually Trip Reactor • Manually SI 	
	RO	Announce Occurrence on page	
	SRO	If Pzr level can not be maintained go to step 1	
	SRO	If location of leak is known, than initiate actions to isolate leak.	Crew may go to step 18
	BOP	Reports Pzr Pressure at or increasing to 2235 psig	
	RO	Reports Main Steam line is INTACT <ul style="list-style-type: none"> • Reactor power at turbine power • NC loop T-Ave is stable 	
	SRO	Refer to RP/000	
	SRO	Ensures OP/O/A/6450/11 done if NC leakage exceeds Tech Spec leakage	
	SRO	Ensures VCT aligned to FWST if VCT level goes below 16%	

Time	Pos.	Expected Actions/ Behavior	Comments
	BOP	Checks the following EMFs normal: <ul style="list-style-type: none"> • 1EMF-38L • 1EMF-39L • 1EMF-40 • 1EMF-41 • 1EMF-46A • 1EMF-46B 	
	BOP	Checks NC pump thermal barrier KC outlet flow computer alarms NORMAL	GO to step 17
	SRO	If leak is suspected on letdown line near demineralizers	It should not be suspected there.
	SRO	If leak on letdown line, then isolate leak as follows:	Leak is not on letdown line.
		<p>If leak is on normal charging line then isolate as follows:</p> <ol style="list-style-type: none"> 1. close letdown isolation valves <ul style="list-style-type: none"> • 1NV-458A • 1NV-457A • 1NV-35A • 1NV-1A • 1NV-2A 2. Isolate charging: <ul style="list-style-type: none"> • Close 1NV-244A • Close 1NV-245B • Manually throttle 1NV-238 to maintain 6-10 gpm seal injection flow per NC pump. 	Crew should have already established excess letdown
	SRO	Checks the following NORMAL: <ul style="list-style-type: none"> • Pzr Safeties • Pzr PORvs • PRT Conditions 	
	SRO	Checks CLAs level NORMAL	
	SRO	Checks the NCDT NORMAL	
	SRO	Checks the containment floor and equipment sumps NORMAL	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Checks VCT intact	
	SRO	Checks NV pump suction – aligned to VCT	
	SRO	Verifies leak has been identified	
	SRO	Verifies leak has been isolated.	
	SRO	Exits procedure	

Event: T-ref Failure

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Recognizes Unwarranted Control Rod Insertion and informs Crew. <ul style="list-style-type: none"> No turbine or reactor power excursion Tref abnormal 	Annunciator AD-6 B -10 T-ref/T-auct Abnormal
	RO	If more than one rod dropped – trip Rx	
	RO	Places CRD Bank Selector Switch to manual and verifies movement stopped	RO places Rods in Manual
	SRO	Enters AP/14, Rod Control Malfunctions and directs activities.	
	RO	Perform the following to maintain T-ave within 1 degree of programmed Tref. <ul style="list-style-type: none"> Lower turbine load or raise T-ave Or <ul style="list-style-type: none"> Borate the NC system to lower T-ave 	
	Ro	Announce occurrence on paging system	
	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 	T-ref identified Go to Enclosure 4
	SRO	Goes to Enclosure 4	
	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. 	

Time	Pos.	Expected Actions/ Behavior	Comments
	RO	Checks the following normal: <ul style="list-style-type: none"> • Turb Imp Press Ch 1 • T-ref indication 	T-ref identified RO will perform the following as necessary to maintain T-ave at T-ref: <ul style="list-style-type: none"> • Position control rods in manual • Borate/Dilute NC system • Adjust turbine load • Notify IAE • Go to step 5
	RO	When the problem is repaired then Ensure T-ave at T-ref +/- 1 degree and auto rod control is desired, then return rod control to auto.	
	SRO	Exits procedure	

Event: **Steam Line Break Inside Containment** E-0 Evaluation

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Go to EP/E-0 and directs activities	
	SRO	Reviews Foldout page with crew	
	RO	Report Reactor Trip: <ul style="list-style-type: none"> • rod bottom lights • reactor trip breakers open • I/R amps decreasing 	
	RO	Reports Turbine Generator tripped <ul style="list-style-type: none"> • TV's or GV's closed 	
	BOP	Reports ETA and ETB energized	
	RO	Reports SI status light - LIT	
	BOP	Report LOCA sequencers (A & B) actuated	
	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	Reports all Ss and St components in Group 4 NOT -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	

Event: Steam Line Break Inside Containment

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Directs Unit 2 Operator to throttle RN to minimum & start 2A RN pump	EXAMINER CUE: • 2A RN pump is running
	RO	Checks/reports all S/G pressures > 775 psig	
	BOP	Reports Containment pressure has remained less than 3 psig	
	BOP	Report NV Pump to Cold Leg Flow gauge - indicating flow - YES • checks NC pressure < 1600 psig • checks NI pumps indicating flow - NO	
	SRO	When available notifies OSM or other SRO to implement Generic Enclosure 21	
	RO	• 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	Reports Pzr PORV & Spray Valves closed	
	BOP	Reports subcooling > 0 deg.	
	BOP	Reports all main steamlines INTACT	NO, crew will go to E-2 and implement F-0 – Crew should go to Z-1

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Monitors foldout page	
	SRO	Dispatches operator to close breakers for 1NI-173A and 1NI-178B	
	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 5.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	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 - only "B" 	
	BOP	Stops all NC pumps - already off Stop all RV pumps - already off	
	BOP	Check phase "B" HVAC equipment	
	RO	Checks MSIVs and MSIV bypass valves closed	
	RO	Checks steamlines intact	No, "D" not intact <ul style="list-style-type: none"> • Reset CA modulating valves • Isolate Faulted S/G Close CA-38, CA-42 and SM-101
	SRO	Checks if any ND train is operating in the cold leg recirc mode - NO	Go to step 12.
	SRO	Ensures operator sent to stop NF AHUs Checks H2 analyzers in service	Go to step 13
	SRO	Returns to procedure and step in effect.	

Event: Steam Line Break Inside Containment E-2

Time	Pos.	Expected Actions/ Behavior	Comments
	Crew	Monitors foldout page	
	Crew	Maintains one S/G available for NC system cooldown	
	SRO	Checks the following closed: <ul style="list-style-type: none"> • All MSIVs • All MSIV Bypasses 	
	SRO	Check at least one S/G pressure – stable or going up	
	RO	Identifies faulted S/G; <ul style="list-style-type: none"> • Any S/G pressure – going down in an uncontrolled manner • Any S/G depressurized 	
	RO	Checks faulted S/G PORV closed	
	RO	Isolates faulted S/G as follows for "D" S/G: <ul style="list-style-type: none"> • Check S/G D FDW Isolated status light LIT • Close 1CA-38B • Close 1CA-42B • Check closed 1BB-4B & 1BB-8A • Close 1SM-101 	
	SRO	Checks if S/G tubes INTACT Checks EMFs normal <ul style="list-style-type: none"> • 1EMF-24 • 1EMF-25 • 1EMF-26 • 1EMF-27 	NO, 1EMF-27 will indicated a tube leak
	SRO	Go to EP-E-3 Steam Generator Tube Rupture	

Time	Pos.	Expected Actions/ Behavior	Comments
	SRO	Implement CSF Status Trees and go to EP/E-3	
	SRO	Go to EP/E-3 and directs activities	
	SRO	Monitor foldout page	
	RO/ BOP	Identify "D" 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 	
	RO	Check S/G 1B and 1C INTACT	
	RO	Check blowdown isolation valves - CLOSED: <ul style="list-style-type: none"> • 1BB- 4 • 1BB- 8 	
	BOP	Close steam drain and check "CLSD" light lit for ruptured S/Gs: <ul style="list-style-type: none"> • 1SM-101 (C SM Line Drain) 	
	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% (32% ACC) Isolates feed flow to "D" S/G <ul style="list-style-type: none"> • Closed 1CA-38B • Closed 1CA-42B 	

Event: SGTR on "D" Steam Generator

Event:	Pos.	Expected Actions/ Behavior	Comments
	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 calve 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 	NO, "D" depressurizing or depressurized
	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% (32% ACC) • 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	
	SRO	Checks the following closed on ruptured S/G: <ul style="list-style-type: none"> • MSIV • MSIV bypass valve 	
	SRO	Checks ruptured S/G pressure greater than 280 psig.	NO, crew should go to ECA 3.1

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

Classification of Event: Alert

SHIFT TURNOVER INFORMATION

UNIT 1 STATUS:

{PRIVATE 100% NCS [B] 13 ppm Pzr [B]: 13 ppm Xe: 2895pcm
}Power Level: _____

{PRIVATE At this power for 400 days Core Burnup: 440 EFPDs
}Power History: _____

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

OTHER INFORMATION NEEDED TO ASSUME TO SHIFT:

"1A" Diesel Generator tagged for maintenance.
"1A" Auxiliary Feedwater Pump Tagged for PM
Switchyard work is in progress
"Unit has .6 gpm unidentified leakage
Unit 2 is available for auxiliary steam
1EMF-33 is inoperable
1B S/G SM PORV is isolated due to leak

Begin load reduction to take the plant to mode 6 to begin refueling outage.
Reactor group has determined it will take 300 gallons of boric acid for the shutdown.
Insert 50 gallons of acid to begin shutdown and use rods for AFD control.
Begin load reduction at 2 MW/min.

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