

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Licensed Operator Initial Training

SUBDIVISION: Simulator

SCENARIO TITLE/NO.: 1LOT5 NRC Exam Scenario #1

COMPUTER CODE FOR L.P.: N/A

Revision No.	Date
1	8/27/02

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 2.0 Hours

PREPARED BY: Western Technical Services Inc. 8/27/02
Date

REVIEWED BY: R. Ernfield 8/27/02
Date

APPROVED FOR IMPLEMENTATION: _____
Date

The Crew will lower power in preparation for removing a feed pump from service (FW-P-1B); however, when power has been lowered to approximately 72%, FW-P-1B will trip, requiring the Crew to rapidly reduce power to less than 63% to avoid a reactor trip.

When plant conditions have stabilized, the controlling pressurizer level channel fails low, letdown isolates, charging flow increases, and actual pressurizer level will rise.

After letdown is reestablished, a controlling steam flow transmitter for the 'B' SG fails low, requiring operator action to take manual control of SG water level to avoid a reactor trip. The Unit Supervisor will also address Technical Specifications for the failure.

After SG level is stabilized, a 500 GPM SGTR will occur in "B" Steam Generator.

After the Operator has taken manual control of feedwater and stabilized SG level, the 'B' SG .

Additionally, the 3B MDAFP and the TDAFP fail to automatically start but may be started manually.

After the crew transitions to E-3, a main steam line break will occur on the "B" SG outside CNMT and upstream of the MSIVs resulting in a faulted/ruptured SG.

Expected procedure flow path is E-0 → E-3 → E-2 → E-3 → ECA-3.1.

INITIAL CONDITIONS: IC 171 PW = 5NRC1

75% power MOL EQU XE, 1128 PPM, CB"D" = 188 steps

<u>ADDITIONAL LINEUP CHANGES</u>	<u>STICKERS</u>	<u>VOND MARKINGS</u>
FW-P-3A in P-T-L FW-P-3A ESF Status Light lit	FW-P-3A YCT W/Red Slash	N/A
<u>EQUIPMENT STATUS</u>	<u>DATE/TIME OOS</u>	<u>TECHNICAL SPECIFICATION(S)</u>
FW-P-3A OOS	24 hours prior	TS 3.7.1.2, Action c

SHIFT TURNOVER INFORMATION

1. Reduce power IAW 10M-52.4.B step IV.A.5 to remove FW-P-1B from service ASAP (1%/min) due to a motor bearing vibration.
2. Severe weather is forecasted for the next 12 hours.
3. FW-P-3A is on clearance due to a motor ground and is not expected back this shift.
- 4.

SCENARIO SUPPORT MATERIAL REQUIRED

1. Power reduction reactivity plan
2. 10M-52.4.B, Load Following

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #1

Lower Rx Power to 63%.

Following the Reactivity Plan, Crew lowers reactor power.

US directs load decrease to < 63% at 1% per minute.

PO initiates turbine load decrease.

RO initiates RCS boration as necessary to maintain Tavg-Tref.

EVENT #2

After power is lowered to 72% **IMF** FW-P-1B trips.
FWM01B (preloaded)

Annunciator A7-37, SG Feed Pump Auto Stop.

Annunciator A7-39, SG Feed Pump Disch Flow Hi Start 2nd Pump.

PO recognizes feed pump trip and informs US.

Refers to ARPs as time permits.

US directs load decrease to < 63% at 5% / minute.

PO decreases turbine load at 5% /minute.

RO RCS Boration to maintain Tavg-Tref.

EVENT #3

After plant conditions have stabilized:

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
IMF PRS06A (0 0) 0	PZR level transmitter LT-RC-459 fails low.		RO recognizes problem with PZR level channel, informs US, refers to ARP, and Instrument Failure Procedure 1.6.4.IF, Attachment 1.
	PZR control level deviation low alarm A4-4.		
	PZR control level low alarm, A4-3. LCV-CH-460A, TV-CH-200A, B, C close.		RO informs US that LT-RC-459 failed low.
	PZR heaters off.		
	Letdown isolates and actual PZR level rises.		US directs Operator to defeat level control input with PZR level channel and recorder selector switches per 1.6.4.IF Attachment 1. RO informs US that Channels 460 and 461 are selected.
Continue with next event when letdown has been reestablished.	Level alarms clear, charging flow begins decreasing, high flow alarm clears.		US directs the Operators to reestablish normal letdown, re-energize pressurizer heaters.
<u>EVENT #4</u>			
“B” SG Steam Flow Transmitter [FT-MS-484] fails low.			
IMF MSS14C (0 0) 0	FT-MS-484 Fails low.		1OM-24.4.IF

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Annunciator A7-50 "Loop 2 Feed > Stm"		US determines that 1OM-24.4.IF Attachment 3 is to be implemented.
	Feedwater flow decreases causing SG levels to decrease.		
	SG level stabilizes.		PO determines which channel has failed by comparing with other steam flow indicators. PO places "B" SG FRV in manual and stabilizes steam generator level. PO selects redundant steam flow transmitter by placing FC-1FW-488 to FM-485 position. PO returns "B" FRV to auto when SG level is returned to normal range.
If desired to trip bistables:			
IOR XS03C23 (0 0) 1 IMF BST-RCS157 (0 0) 0 IMF BST-RCS056 (0 0) 0 DOR XS03C23	Protection chanel III door 18 open. BS-488C tripped. BS-488B tripped. Protection chanel III door 18 closed.		Crew monitors tripping of bistables associated with FT-MS-484.
Continue with scenario at examiners discretion.			

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EVENT #5

After the Operator has taken manual control of feedwater and stabilized SG level:

IMF RCS03B (0 0) 500

“B” SGTR 500 gpm

A4-88, Steam Gen N-16 Monitor Alert/High Trouble.
A4-71, Rad Monitor High.
A4-72, Rad Monitor High High.

RO calls out alarms to crew.

US dispatches operator to N-16 monitor.

After appropriate delay, report N-16 monitor alarm is associated with the “B” SG.

PZR level reducing.
PZR pressure reducing.
Charging flow increasing.
Additional Annunciators associated with degrading plant conditions actuate.

RO reports degrading plant conditions.

US directs RO to manually trip the reactor and crew to perform IMAs of E-0.

Crew performs immediate operator actions of E-0.

Crew performs IMAs of E-0.

Reactor trip and bypass breakers open.
Neutron flux decreasing.
Rod bottom lights lit.
Rod position indication at 0.

RO verifies reactor tripped.

RO sounds standby alarm.

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<p>NOTE: If crew does not manually actuate SI at this time, SI will be required due to degrading overall status due to SGTR on "B" SG. Crew will be required to return to E-0 at that time.</p>	Throttle and governor valves closed. Reheat stops and interceptors closed.		PO verifies turbine tripped.
	Depress reheat controller, reset pushbutton. Reheat flow control and block valves closed.		PO ensures reheat steam isolated.
	Main generator output breakers open. Main Generator Volts zero. Exciter circuit breaker open.		PO verifies generator trip.
	1AE / 1DF buses energize.		PO verifies power to AE/DF buses.
	RCS pressure reducing. PZR level continues to reduce.		Crew checks for SI, assesses plant status and manually actuates SI if not already actuated, continues with E-0.
	<p>Only exceptions to Attachment 1-K are: FW-P-3A OOS at turnover. FW-P-2 & FW-P-3B failed to auto start and were started manually.</p> <p>All other checks/conditions SAT for current plant conditions.</p>		US directs operator to perform Attachment 1-K, Verification of Automatic Actions, as time/manpower permit, continues with E-0.

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<p><u>CT E-0.F:</u> CT-#1 Crew establishes the minimum required AFW flow to the SGs before transition out of E-0 unless the transition is to FR-H.1 in which case the task must be initiated before RCPs are manually tripped IAW FR-H.1.</p>	<p>FW-P-2 and FW-P-3B manually started.</p>	<p>PO starts FW-P-2 and FW-P-3B, verifies AFW flow, and informs US.</p>	<p style="text-align: right;">CT-#1</p>
<p>When requested to align WR H₂ analyzers insert:</p> <p>IMF XN02097 (0 0) 1 IMF XN02105 (0 0) 1</p> <p>and report actions to the control room</p>	<p>Automatic actions eventually occur: SI, CIA, FWI.</p> <p>Annun A2-97 energizes. Annun A2-105 energizes. H₂ analyzers in service.</p> <p>VS-F-4A running.</p> <p>Tavg approx 547°F and stable.</p>	<p>Crew directs operator to place wide range H₂ analyzers in service.</p> <p>PO verifies at least one leak collection exhaust fan running.</p> <p>RO/PO check RCS Tavg stable at or trending to 547°F.</p>	

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to E-3.	PORVs, safeties and spray valves indicate closed. PRT parameters as expected for current plant conditions. PORV lineup SAT.		RO checks PRZR PORV's, safeties, spray valve closed. RO checks PRT conditions.
	RCPs running.		RO checks PORV lineup.
	No SGs faulted.		RO reports RCPs running.
	"B" SG level rising in uncontrolled manner.		PO checks if any SGs are faulted.
			Crew identifies "B" SG as being ruptured.
	CREBAPS not actuated, not required.		US exits E-0, enters E-3 and informs crew.
	All RCPs running. CCR flow, RCS/SG D/P > 200 psig.		Crew checks CREBAPS status.
	"B" SG identified.		RO checks if RCPs should be stopped, does not stop RCPs.
	PCV-MS-101B closed. HCV-MS-104 closed.		US identifies "B" S/G as the ruptured S/G, based on operator reports.
	Steam supply from ruptured SG to FW-P-2 NOT PREVIOUSLY ISOLATED.		RO/PO verify "B" S/G atmospheric dump valve and RHR valve closed.
	FW-P-3A OOS at turnover.. FW-P-3B – running.		Crew determines status of steam supply to FW-P-2. PO reports status of Motor driven AFW pumps.

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	MOV-MS-105 shut.		US directs closure of MOV-MS-105.
	MS-16 – open. MS-17 – closed.		Crew addresses the fact that TDAFW supply valve MS-16 is NSA open, it must be closed and MS-17 must be opened.
IMF MSS18B (2 0) 1E5 IMF XN11026 (2 0) 1 (both pre-loaded)	TV-MS-111B shut. “B” SG main steam trip, bypass and non-return valves shut. TV-MS-101B MOV-MS-101B NRV-MS-101B		US directs operators to isolate flow to/from the “B” S/G.
Steam Leak on “B” steam line in MS valve room when TV-MS-101B is shut.			
	A11-26, Main Steam Valve Room Temp High. Steam Flow indicated on “B” SG. “B” SG pressure reducing.		PO reports A11-26 alarm and indication of steam flow on “B” SG, and “B” SG pressure reducing.
NOTE: Drill assumes crew identifies fault on “B” Main Steam Line and transitions to E-2 at this time based on left hand page criteria.			
Crew transitions to E-2.			US makes transition to E-2, and informs crew.
As U-2 operator, when requested, report proper CREBAPS actuation.	Bottle discharge lights lit. Intake and exhaust dampers closed.		PO verifies CREBAPS actuated, requests Unit 2 CREBAPS verification.
	All yellow SLI marks lit.		Crew verifies steam line isolation.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Note: "A" and "C" SG pressures may be dropping due to effects of "B" SG fault, but should not be diagnosed as faulted.	"A" and "C" SG pressure stable.		PO checks for any non-faulted SG.
	"B" SG pressure dropping uncontrollably.		PO identifies "B" SG as faulted.
	FCV-FW-488 closed.		PO verifies "B" MFRV closed.
	FCV-FW-489 closed.		PO verifies "B" BPFRV closed.
	MOV-FW-151C & D closed.		PO closes MOV-FW-151C & D.
As operator sent to swap steam supply to FW-P-2, report that you are unable to enter the Main Steam Valve Room due to steam leak.	MS-16 open. MS-17 closed.		PO reports that operator is unable to shift steam supply to FW-P-2 due to steam leak in the area.
	PCV-MS-101B closed. HCV-MS-104 closed.		RO/PO verify "B" S/G atmospheric dump valve and RHR valve closed.
	"B" SG previously identified as ruptured.		Crew checks if SG tubes are intact.
Crew transitions back to E-3			US directs return to E-3, directs crew through High Level Action Steps previously performed.
	AFW secured to ruptured S/G in E-2 regardless of NR level. "B" - MOV-FW-151C & D – CLOSED.		PO checks ruptured SGWL and maintains AFW flow isolated to "B" SG
	FWI previously verified.		PO re-verifies FWI has occurred.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Ruptured SG pressure > 380 psig.		PO verifies ruptured SG pressure is greater than 380 psig.
	Station instrument air pressure > 100 psig.		PO verifies station air pressure > 100 psig.
	Target temperature determined based on ruptured SG pressure. 1000 – 1099# -- 507F (491F adverse). 900 – 999# -- 495F (479F adverse).		US determines target temperature. SNA trends cooldown rate.
	Condenser steam dumps NOT available due to MSLI.		Crew initiates RCS cooldown at the maximum rate to the target temperature using "A&C" Atmospheric Steam Dumps.
	RCS pressure < 1950 psig.		RO blocks steamline SI when RCS pressure is below 1950 psig.
	Average of the 5 highest TCs at target temperature.		Crew stops RCS cooldown and maintains RCS at target temperature.
	Intact SG levels > 13% (30% adverse) NR.		PO checks intact SG levels, controls levels between 20% (36% adverse) and 50% .
	Power to all block valves. All PORVs closed. All block valves open, all PORVs in auto.		RO checks/reports status of PORVs and block valves.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to ECA-3.1	SI reset: PNL 62-C4 NOT LIT. PNL 62-D4 LIT. CIA/CIB reset.		RO resets SI, CIA, and CIB.
	CNMT instrument air available (> 100 psig, A6-110 NOT LIT).		PO checks/reports CNMT instrument air system status.
	RCS pressure > 300 psig (475 psig adverse).		
	LHSI pumps stopped/in auto.		RO stops LHSI pumps, places them in auto.
	Core exits TCs maintained < target temperature.		PO controls RCS temperature at/below target temperature.
	Ruptured SG pressure DROPPING to W/I 250# of intact SGs.		PO reports status of ruptured SG pressure.
			US directs transition to ECA-3.1 based on operator reports.
	RWST level > 19 ft.		RO verifies RWST level > 19 ft.
	Previously performed.		RO verifies SI, CIA and CIB reset.
	Stub busses energized.		PO verifies stub busses energized.
	CNMT Inst Air system operating properly.		PO verifies CNMT instrument air available.

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	All busses energized.		PO verifies all AC busses - energized by offsite power.
	PZR HTRS in PTL.		RO places all PZR heaters in pull to lock.
	CIB has not actuated.		RO checks if any Quench Spray Pumps running.
	"B" SG steam and feed flow isolated previously.		PO checks ruptured SG NR level > 13%, then verifies "B" SG isolated regardless of SGWL.
	RCS pressure greater than 300 psig. Pressure not reducing unexpectedly. (may be reducing due to cooldown, but not due to RCS LOCA).		RO reports LHSI pumps previously stopped and in auto.
	Aux Building and safeguards radiation - consistent with pre-event values. Obtain samples as required.		US initiates evaluation of plant status.
	"B" S/G previously identified and isolated. "A" and "C" intact.		PO checks if all SGs are faulted.
	"A" & "C" Narrow range level - greater than 13%.		PO checks intact SG levels.
	Control feed flow to maintain "A" & "C" SG narrow range level between 20 and 50%.		PO controls feed flow as required.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Station instrument air previously verified > 100 psig.		PO checks station air pressure.
			US directs chemistry to sample RCS boron hourly for SDM verification.
<u>ECA-3.1.B</u> CT #2 - Crew initiates cooldown of the RCS to cold shutdown conditions at the highest rate achievable but less than 100°F/hr in all RCS cold legs.	Do not exceed 100°F/hour cooldown in RCS cold leg.		PO commences cooldown using "A" & "C" S/Gs atmospheric relief valves at < 100°F per hour. CT #2
	RWST level > 38 ft.		US checks if subcooled recovery is appropriate and continues with the next step.
Terminate drill when crew checks if subcooled recovery is appropriate in ECA-3.1.	"B" SG narrow range level < 94 [83]%. Collect logs after crew completes.		PO checks ruptured SG NR level < 94%.

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PROGRAM TITLE: Licensed Operator Initial Training

SUBDIVISION: Simulator

SCENARIO TITLE/NO.: ILOT5 NRC Exam Scenario #2

COMPUTER CODE FOR L.P.: N/A

Revision No.	Date
1	8/27/02
2	9/26/02
3	9/30/02

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 2.0 Hours

PREPARED BY: Western Technical Services Inc. 8/27/02
Date

REVIEWED BY: R. Ernfield 9/30/02
Date

APPROVED FOR IMPLEMENTATION: _____
Date

INITIAL CONDITIONS: IC 172 PW = 5NRC2

97% power, Equ. XE, MOL, 1055 PPM, CB"D" = 215 steps.

<u>ADDITIONAL LINEUP CHANGES</u>	<u>STICKERS</u>	<u>VOND MARKINGS</u>
FW-P-3A in P-T-L FW-P-3A ESF Status Light lit	FW-P-3A YCT W/Red Slash	N/A
<u>EQUIPMENT STATUS</u>	<u>DATE/TIME OOS</u>	<u>TECHNICAL SPECIFICATION(S)</u>
FW-P-3A is OOS	24 hours prior	TS 3.7.1.2 Action c

SHIFT TURNOVER INFORMATION

1. Raise power to 100%.
2. Severe weather is forecasted for the next 12 hours.
3. FW-P-3A is on clearance due to a motor ground and is not expected back this shift.
- 4.

SCENARIO SUPPORT MATERIAL REQUIRED

1. Power Increase reactivity plan
2. 10M-52.4A, Raising Power From 5% To Full Load Operation

Scenario Description

The Crew will raise power.

After power has been raised to 100%, and the control rods are placed in automatic, a Power Range Channel summing amplifier output failed high will cause inadvertent, automatic rod motion, requiring operator action to place rod control in manual to stop inward rod motion. The Unit Supervisor will also be required to address Technical Specifications.

After conditions have stabilized and actions have been taken for the failed Power Range Channel, the Letdown Backpressure Regulator valve PCV-CH-145 fails closed, resulting in a loss of normal letdown, increased pressure in the letdown line, and lifting of the letdown relief valve with associated alarms.

After the Letdown Backpressure Regulator valve is reopened with the controller in manual and letdown is restored, one running Component Cooling (CCR) Pump trips, and PCV-CC-100 fails requiring the operator to take manual control and restore pressure.

A CCR Supply line leak will develop in the supply line to RCP 'B' and ramp to 500 GPM over a ten minute period, requiring operator action to locate and isolate the leak.

Before the reactor can be manually tripped, RCP 'B' will experience a locked rotor resulting in an automatic reactor trip.

Following the reactor trip, the Main turbine will fail to trip automatically and the MSIVs will fail to close automatically requiring operator action to manually trip the turbine and close the MSIVs.

Also following the reactor trip, an RCS Loop "B" large break LOCA will occur at 2000 GPM, and a failure of automatic safety injection Train A and Train B will occur, requiring operator action to manually initiate safety injection.

Procedure flow path is E-0 → E-1.

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<u>EVENT 1</u> Raise power to 100%.	Turbine load and reactor power increasing at 12%/hr.		US assumes control and directs Operators to increase reactor power to 100% IAW 10M-52.4.A, Step A.118
			Crew reviews/agrees with reactivity plan. US approves for use. Crew begins power increase. RO places rod control in automatic when 100% power is reached.
<u>EVENT 2</u> Power Range NI N-44 fails HIGH. After power has been raised to 100% and control rods are placed in automatic IMF NIS03D (0 0) 200	PR Channel N44 fails high.		RO notes failure and informs US/crew.
	N44 power indications upscale.		
	Annunciator A4-69, Neutron Flux Rate High alarms. Annunciator A-465, NIS PR High Setpoint Neutron Flux High.		RO determines failed instrument.
	Control Rods insert.		US directs RO to place Control Rods in MANUAL.
	Rod motion stops.		RO places rod control in manual.

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US refers to AOP 1.2.1C, Power Range Channel Malfunction.

US directs turbine load decrease at 1%/min to maintain Tavg within 2°F of Tref. PO initiates turbine load decrease.

PO removes control power supply fuses from drawer A of N-44 within 6 hours.

PO turns Rod Stop Bypass switch to BYPASS for N44.

PO turns the Comparator Channel Defeat switch to N44.

RO verifies vertical board recorders are selected to monitor only operable detectors.

US refers to T.S. 4.2.1.1.b – directs that AFD be monitored and trended in accordance with 10M-49.4.L.

T.S. 3.2.4 – QPTR

T.S. 3.3.3.1 Table 3.1, Item 2, Action 2

Note:
STA will perform (simulate) QPTR and report satisfactory results.

Continue with next event at Lead Examiner's discretion.

EVENT 3

IOR X06A087P (0 0) 1

PCV-1CH-145 fails closed, resulting in a loss of normal letdown.

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<p>Proceed with next event at evaluators discretion.</p> <p><u>EVENT 4</u></p> <p>IMF CCW3A (5 0) IMF CCW08B (5 0) 500 600 0 IOR X16A056P (5 0) 0 TRG! 5</p>	Annunciator A3-107, NRHX Disch Press High.		RO notes indications and alarms, informs US.
	After delay, A3-123, Regen Heat Exchanger Relief Line Temp High.		US refers to AOP 1.7.1.
			RO reports zero flow indicated on 1CHS-FI150.
			RO takes manual control of PCV-1CH-145 and restores letdown flow to previous value.
			US contacts I&C to investigate failure of PCV-CH-145.
	Running CCR Pump trips and PCV-1CC-100 Fails Open		
	A6-33, Primary Comp Cool Pump Auto Start-Stop.		Crew identifies trip of running CCR pump, informs US.
	A6-35, Pri Comp Cool Pump Disch Press Low.		
	A6-38, Pri Comp Cool Wtr Heat Exchanger 8" Disch Line Flow Low.		
	A6-46, Pri Comp Cool Wtr Heat Exchanger 14" Disch Line Flow Lo.		

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>NOTE: Drill assumes crew goes directly to AOP 1.15.1 "Loss of Primary Component Cooling Water"</p>	<p>A3-75, React Cool PP Lower Brg Lube Oil Cool Water Flow Low. A3-77, React Cool PP Stator Winding Cool Water Flow Low. A3-83, React. Cool PP Upper BRG Lube Oil Cool Water Flow Low</p>		US acknowledges reports, enters AOP 1.15.1.
	CCR Surge tank level on scale.		PO reports CCR surge tank level normal.
<p>NOTE: Leak is slowly increasing, tank level reduction at this time may not be noticed by crew. Opening of LCV-CC-100 may not be noticed at this time but will seen as leak rate continues to increase.</p>	<p>CC-P-1A tripped. CC-P-1B in operation supplying the header.</p>		RO reports CC-P-1B operating.
	CCR surge tank level is slowly reducing. Auto makeup valve slowly opening.		Crew monitors surge tank level for trends.
<p>NOTE: Drill assumes crew will address low pressure first and then notice level reduction</p>	<p>1 CCR pump operating, 1 pump tripped. CCR pump discharge pressure low. PCV-CC-100 failed open.</p>		RO reports pump status and that second pump cannot be started due to CC-P-1C not racked onto ANY bus.
	1 CCR pump operating		US implements actions of Attachment 3, "CCR Pump Discharge Pressure Low". RO reports only 1 CCR pump available

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	CCR pump discharge pressure low. CCR temperature normal. CCR flow low due to PCV open.		RO reports CCR system status, places CC-P-1A in PTL.
	PCV-CC-100 indicates 100% demand.		Crew determines PCV-CC-100 failed open.
	CCR system pressure returning to normal.		US directs PO to place PCV-CC-100 in "manual" and restore system pressure.
	Decreasing CCR surge tank level. A6-37, Pri Comp Cool Wtr Surge Tank Level High-Low.		Crew identifies and reports leak in CCR system.
			US implements actions of Attachment 1 based on continuous action step 3.
	LCV-CC-100 in manual and opened.		US directs PO to place LCV-CC-100 in manual and open valve to restore level.
	A1-49, Containment Sump Level High.		Crew determines that CCR header leak is inside containment.
	Non-essential loads isolated.		Crew attempts to locate the leak.
			US may direct a reactor shutdown.
			US will direct reactor trip per AOP 1.6.8 "Abnormal RCP Operation" for any of the following: Pump radial brg temp >210F Seal leakoff temp > 225F Motor brg temp > 200F

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT 5

Prior to Crews decision to manually trip the Reactor,

IMF RCS09B (0 0)

RCP "B" locked rotor.

The Main Turbine will fail to trip automatically following the reactor trip.
LOW Loop 2 flow indication low (< 90%)

CREW – Identify/report trip of RCP with loss of RCS loop flow

Loop – 3 R.C. LOW FLOW Status Panel lights lit (Chan I RED, Chan II WHITE, Chan III BLUE)

RO and PO commence immediate actions of E-0, US references E-0 to verify immediate actions.

Crew performs immediate operator actions of E-0.

Crew performs IMAs of E-0.

EVENT #5:

**IMF RCS02B (1 0) 2000
(preloaded)**

Reactor trip and bypass breakers open.
Neutron flux decreasing.
Rod bottom lights lit.
Rod position indication at 0.

RO verifies reactor tripped.

2000 gpm LOCA inside CNMT when the reactor is tripped

RO sounds standby alarm.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<u>EVENT #5 (cont)</u> AUTO TURBINE TRIP FAILURE. <u>CT#1 E-0.Q:</u> Crew manually trips the main turbine before a Severe (orange path) challenge develops to either the Sub-criticality or the Integrity CSF or before transition to ECA-2.1, whichever occurs first.	Throttle and governor valves OPEN . Reheat stops and interceptors OPEN .		PO reports the turbine did not trip automatically.
			US directs the PO to trip the main turbine manually.
			CT#1
	Both turbine pushbuttons depressed.		PO manually trips the main turbine.
			CT#1
	Throttle and governor valves closed. Reheat stops and interceptors closed.		PO verifies turbine tripped.
	Depress reheat controller, reset pushbutton. Reheat flow control and block valves closed.		PO ensures reheat steam isolated.
	Main generator output breakers open. Main Gen volts 0. Exciter circuit breaker open.		PO verifies generator trip.
	1AE / 1DF buses energize.		PO verifies power to AE/DF buses.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p><u>CT#2 E-0.D:</u></p> <p>Crew manually actuates at least one train of SIS actuated safeguards before transition to any ORP.</p>	<p>RCS pressure reducing. CNMT pressure/temp. increasing.</p>		<p>Crew checks for SI, assesses plant status and manually actuates SI if not already actuated, continues with E-0.</p>
	<p>Only exceptions to Attachment 1-K are: FW-P-3A OOS at turnover AUTO SI (BOTH TRAINS) failure. AUTO MSIV closure failure.</p> <p>All other checks/conditions SAT for current plant conditions.</p>		<p>CT#2</p> <p>US directs operator to perform Attachment 1-K, Verification of Automatic Actions, as time/manpower permit, continues with E-0.</p>
<p><u>NOTE:</u> MSIVs failed to auto close on low steamline pressure. Crew should close MSIVs. If not closed at this time, Crew should close MSIVs when CNMT pressure increases above 3 psig.</p> <p>When requested to align the WR H₂ analyzers insert:</p> <p>IMF XN02097 (0 0) 1 IMF XN02105 (0 0) 1</p> <p>And report actions to the control room.</p>	<p>Annun A2-97 energizes. Annun A2-105 energizes. H₂ analyzers in service</p>		<p>Crew directs operator to place wide range H₂ analyzers in service.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	VS-F-4A running.		PO verifies at least one leak collection exhaust fan running.
	Tavg < 547°F and dropping		RO/PO check RCS Tavg stable at or trending to 547°F, report Cold Leg temperatures dropping.
	PORVs, safeties and spray valves indicate closed. PRT parameters as expected for current plant conditions. PORV lineup SAT.		RO checks PRZR PORV's, safeties, spray valve closed. RO checks PRT conditions. RO checks PORV lineup.
RCPs may be secured due to loss of CCR flow.	"A & C" RCPs running. (may be stopped).		RO reports RCPs status.
	SGs not faulted		Crew verifies no SGs faulted.
	All SG Tubes intact.		Crew verifies no SGTR event in progress.
Crew transitions to E-1.			US makes transition to E-1, informs crew.
	CREBAPS not required.		PO re-checks control room habitability.
NOTE: Drill assumes that RCP trip criteria is met at this point in the drill.			
CT#3 E-1.C: Crew trips all RCPs when RCS to highest SG D/P criteria is exceeded and SI flow verified prior to exiting procedure E-1.	RCPs stopped.		RO stops RCPs if not previously performed when trip criteria exceeded.

CT#3

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	SGs not faulted.		PO checks if any SG is faulted.
			PO maintains intact SG levels 13% [30%] to 50%.
	NR level 13% to [30%] 50% or total feed flow > 355 gpm.		Crew checks intact SG level.
	Instrument air pressure >100 psig.		PO verifies PI-1IA-106 > 100 psig.
	PORV shut in auto and block valve energized.		RO verifies PORVs and block valves.
	No SG levels rising in an uncontrolled manner, no secondary rad monitor alarms.		PO checks for ruptured SG.
	No PZR level RCS pressure reducing		RO/PO check if SI can be terminated.
	CIB not actuated.		US checks if CTMT spray should be stopped.
	SI & CIA reset.		RO resets SI & CIA.
	RCS pressure > 300 PSIG and decreasing.. LHSI pumps not stopped.		RO checks if LHSI pumps should be stopped, does not stop LHSI pumps.
	All SG pressures stable.		PO checks SG pressures stable or rising.
	RCS pressure reducing.		RO checks RCS pressure stable or reducing.

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Terminate drill.

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Licensed Operator Initial Training

SUBDIVISION: Simulator

SCENARIO TITLE/NO.: 1LOT5 NRC Exam Scenario #3

COMPUTER CODE FOR L.P.: N/A

Revision No	Date
1	8/27/02

Revision No	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 2.0 Hours

PREPARED BY: Western Technical Services Inc. 8/27/02
Date

REVIEWED BY: R. Ernfield 8/27/02
Date

APPROVED FOR IMPLEMENTATION: _____
Date

Scenario Description:

The Crew shifts in-service turbine plant component cooling pumps and continues the reactor startup increasing reactor power above 10%.

After exceeding 10% power, an intermediate range instrument power fuse blows requiring the RO to verify the failed instrument channel. The Unit Supervisor should direct actions in accordance with AOP-1.2.1B and refer to Technical Specifications.

The Pressurizer master level controller then fails low causing charging flow to decrease, backup heaters to turn off as level drops, and letdown to isolate. The RO must take manual control of the Pressurizer level controller to terminate the event.

After Pressurizer level control is re-established, the steam header pressure transmitter fails high causing the condenser steam dump valves to open. After identifying the failure, the PO will take manual control and close the steam dump valve.

When conditions have stabilized, a steam break occurs on 'C' SG inside containment followed by failure of the reactor to automatically trip; however, manual trip is available from BB "A" only.

Following safety injection, quench spray pump '1A' trips and quench spray pump '1B' fails to start automatically but can be manually started. Containment isolation phase 'B' isolation then fails to actuate automatically, but can be manually initiated by the operator.

The expected procedure flow path is E-0 → E-2 → ES-1.1.

INITIAL CONDITIONS: IC 173 PW = 5NRC3

7% power, equ XE, BOL, 1868 PPM boron, CB "D" at 103 steps.

<u>ADDITIONAL LINEUP CHANGES</u>	<u>STICKERS</u>	<u>VOND MARKINGS</u>
FW-P-3A in P-T-L FW-P-3A ESF Status Light lit	FW-P-3A YCT W/Red Slash	N/A
<u>EQUIPMENT STATUS</u>	<u>DATE/TIME OOS</u>	<u>TECHNICAL SPECIFICATION(S)</u>
FW-P-3A is OOS	2 hours ago	TS 3.7.1.2 Action c

SHIFT TURNOVER INFORMATION

1. Shift the in-service CCT pumps.
2. Continue with the plant startup.
3. Severe weather is forecasted for the next 12 hours.
4. FW-P-3A is on clearance due to a motor ground and is not expected back this shift.

SCENARIO SUPPORT MATERIAL REQUIRED

1. Power increase reactivity plan
2. 1OM-52.4A, Raising Power From 5% To Full Load Operation

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When the shift turnover is complete, place the Simulator to RUN and commence the drill. <u>EVENT #1</u>	Simulator running.		Crew assumes control of the unit.
Shift in-service CCT Pumps			PO shifts in-service CCT Pumps. Verify 1CC-P-3B aligned for standby operation.
			Direct local operator to verify 1CC-P-3B has adequate oil level.
	1CC-P-3B running.		Start 1CC-P-3B.
			Direct local operator to verify proper operation.
	1CC-P-3A stopped.		Stop 1CC-P-3A and place control switch in automatic.
<u>EVENT #2</u>			
Reactor Power Increase			
Continue with plant startup.	Reactor at 7% power.		Crew commences power increase in accordance with reactivity plan.
			US references 1OM-52.4.A, Step 4.b to continue the power increase.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			RO commences raising reactor power to between 10 and 20%.
	Status lights on Panel 176 actuate at 10%.		RO verifies P-10 bistables actuate as required as power increases to > 10%.
	Status light Intermediate Range Rx Trip blocked is on.		RO blocks the IR Trip and Rod Stop and verifies status lights on.
	Status light Power Range Low Setpoint Blocked in on.		RO blocks Power Range low Overpower Trip and verifies status lights on.
	NOT P-7 is off.		RO verifies that status light NOT P-7 is off.
			RO selects highest power range channels on NR-45 recorder.

EVENT #3

Intermediate Range NI-35 Failure Meters for NI-35 indicate zero and blown fuse indication exists on drawer.

After Crew has raised reactor power to greater than 10% and IR trips have been blocked, insert:

IR Channel NI-35 Inst.pwr. fuse blows.

IMF NIS07A (0 0) 0

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Rod block alarms actuated. Loss of detector/compensating voltage.		
	A4-93, NIS Intermediate Range Loss Of CH I Detector Voltage		RO acknowledges alarms and performs a channel check to identify NI-35 as the failed channel.
	A4-94, NIS Intermediate Range Loss Of CH I Compensation Voltage		<p>US refers to AOP-1.2.1B. Verifies Unit is in Mode 1 and goes to step 4.</p> <p>Crew verifies power still greater than 10% and intermediate range trip is still blocked.</p> <p>Crew places a caution tag on source range channels.</p> <p>US references Technical Specification 3.3.1.1.</p> <p>US directs the Crew to continue with the Unit startup.</p> <p>RO withdraws rods to raise reactor power to 15 to 18%.</p> <p>RO/PO maintain reactor power, T_{avg}, and SG level in preparation for Unit synchronization.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #4

IMF PRS013 (0 0) 0

PZR Level Controller Fails Low

Charging pump flow decreases. Backup heaters may turn off as level drops. Letdown isolation may occur.

A3-58, Charging Pump Disch Flow High/Low

PZR level control in manual.

RO notes indications and alarm, informs US.

US refers to ARP's.

US directs RO to take manual PZR level control.

RO takes manual control of PZR level controller.

US requests I&C to investigate controller failure.

EVENT #5

IMF MSS11 (0 0) 1400 45

PT-1MS-464 Fails High over 45 sec.

Condenser steam dump valves open.

PO recognizes steam dumps opening and diagnoses failure of PT-1MS-464.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Steam dump valves closed.		<p>US directs PO to take manual control of steam dump valve controller.</p> <p>PO takes manual control of AM-1MS-464B and closes steam dump valves.</p> <p>US contacts I&C to investigate failure.</p>
<u>EVENT #6</u>			
IMF MSS1C (0 0) 9E5 120	SG "C" Main Steam Line Break Inside Containment		
	Containment temperature and pressure rising.		US directs manual reactor trip due to rising containment pressure.
IMF CRF12A (pre-loaded)	Reactor fails to automatically trip.		<p>RO and PO commence Immediate Operator Actions of E-0.</p> <p>RO informs US of failure of reactor trip and first out annunciators.</p> <p>US directs RO to manually trip the reactor.</p>
<u>CT#1 E-0.A:</u> Crew manually trips the reactor from the control room before performing the mitigation strategy of FR-S.1.	<p>Reactor trip from BB "B" unsuccessful.</p> <p>Reactor trip from BB "A" successful.</p>		<p>RO reports failure to trip from BB "B" and attempts manual trip from BB "A" and reports trip successful.</p> <p style="text-align: right;">CT#1</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew performs immediate operator actions of E-0.	Reactor trips, turbine trips, RCS pressure drops.		Crew performs IMAs of E-0.
	Reactor trip and bypass breakers open. Neutron flux decreasing. Rod bottom lights lit. Rod position indication at 0.		RO verifies reactor tripped. RO sounds standby alarm.
	Throttle and governor valves closed. Reheat stops and interceptors closed.		PO verifies turbine tripped.
	Depress reheat controller, reset pushbutton. Reheat flow control and block valves closed.		PO ensures reheat steam isolated.
	Main generator output breakers open. Main Generator Volts zero. Exciter circuit breaker open.		PO verifies generator trip.
	1AE / 1DF buses energize.		PO verifies power to AE/DF buses.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>NOTE: If crew does not manually actuate SI at this time, SI will be required due to degrading overall status due to steam break on "C" SG. Crew will be required to return to E-0 at that time.</p>	<p>RCS pressure reducing. CNMT pressure/temp. increasing. "C" S/G pressure reducing more than "A & B" S/Gs.</p> <p>Only exceptions to Attachment 1-K are:</p> <p>FW-P-3A OOS at turnover. Auto CIB failed to actuate. QS-P-1B failed to auto start. QS-P-1A trips after startup.</p> <p>All other checks/conditions SAT for current plant conditions.</p>		<p>Crew checks for SI, assesses plant status and manually actuates SI if not already actuated, continues with E-0.</p> <p>US directs operator to perform Attachment 1-K, Verification of Automatic Actions, as time/manpower permit, continues with E-0.</p>
<p>NOTE: Plant/containment conditions will degrade due to steam break.</p> <p>The following actions to satisfy CT#2 may be performed at some later time in the drill if CIB conditions have not been exceeded at this time.</p>	<p>Automatic actions eventually occur: SI, CIA, FWI, MSLI.</p> <p>CNMT pressure > 8 psig. CIB not actuated.</p>		<p>RO reports CNMT status and that CIB has not occurred.</p> <p>US directs RO to manually actuate CIB.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CT#2 E-0.E: Crew manually actuates at least the minimum required complement of CNMT cooling equipment before an Extreme (red path) challenge develops to containment.			RO manually actuates CIB by pressing 4 PBs (2 per train) and reports actions to US.
			CT#2
	QS-P-1B does not auto start.		RO stops RCPs after CIB initiation, informs US.
			RO notes failure of QS-P-1B to start, manually starts pump, reports action to US.
			CT#2
	QS-P-1A trips 15 seconds after start.		Crew notes loss of QS-P-1A, reports to US.
When requested to align WR H ₂ analyzers insert:	Annun A2-97 energizes. Annun A2-105 energizes. H ₂ analyzers in service.		Crew directs operator to place wide range H ₂ analyzers in service.
IMF XN02097 (0 0) 1 IMF XN02105 (0 0) 1			
and report actions to the control room	VS-F-4A running.		PO verifies at least one leak collection exhaust fan running.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Tavg reducing due to faulted SG.		RO/PO check RCS Tavg stable at or trending to 547°F.
	PORVs, safeties and spray valves indicate closed. PRT parameters as expected for current plant conditions. PORV lineup SAT.		RO checks PRZR PORV's, safeties, spray valve closed. RO checks PRT conditions. RO checks PORV lineup.
	RCPs NOT running due to CIB		RO reports RCPs status.
	"C" SG pressure dropping.		PO checks if any SGs are faulted.
Crew transitions to E-2.			US makes transition to E-2, and informs crew. US directs SNA to monitor status trees.
As U-2 operator, when requested, report proper CREBAPS actuation.	Bottle discharge lights lit. Intake and exhaust dampers closed.		PO verifies CREBAPS actuated, requests Unit 2 CREBAPS verification.
	All yellow SLI marks lit.		Crew verifies steam line isolation.
Note: "A" and "B" SG pressures may be dropping due to effects of "C" SG fault, but should not be diagnosed as faulted.	"A" and "B" SG pressure stable.		PO checks for any non-faulted SG.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	"C" SG pressure dropping uncontrollably.		PO identifies "C" SG as faulted.
	FCV-FW-498 closed.		PO verifies "C" MFRV closed.
	FCV-FW-499 closed.		PO verifies "C" BPFRV closed.
	MOV-FW-151A & B closed.		PO closes MOV-FW-151A & B.
	MS-17 NSA closed.		Crew addresses the fact that TDAFW supply valve MS-17 is NSA closed.
	PCV-MS-101C closed. HCV-MS-104 closed.		RO/PO verify "C" S/G atmospheric dump valve and RHR valve closed.
	No SG level rising in an uncontrolled manner.		Crew checks if SG tubes are intact.
NOTE: If "C" SG has completely blown down by this time, conditions to terminate SI will be met and crew will transition to ES-1.1. If so, skip to page 16 for ES-1.1 actions. If SI termination criteria not met, crew transitions to E-1.	Subcooling > 43 [58]°. Secondary heat sink sufficient. RCS pressure stable or rising. PRZR level > 18 [37]%. Crew transitions to E-1.		RO/PO check if SI can be terminated and if so, transition to ES-1.1. US makes transition to E-1, informs crew

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	CREBAPS actuated per E-2.		PO re-checks control room habitability.
	RCPs NOT running.		RO checks if RCPs should be stopped.
	“C” SG previously diagnosed as faulted and isolated (pending reports of local operator actions).		PO checks if any SG is faulted.
			PO maintains intact SG levels 13% [30%] to 50%.
	NR level 13% to [30%] 50% or total feed flow > 355 gpm.		Crew checks intact SG level.
	Instrument air pressure >100 psig.		PO verifies PI-1IA-106 > 100 psig.
	PORV shut in auto and block valve energized.		RO verifies PORVs and block valves.
	No SG levels rising in an uncontrolled manner, no secondary rad monitor alarms.		PO checks for ruptured SG.
	Subcooling > 43 [58]°. Secondary heat sink sufficient. RCS pressure stable or rising. PRZR level > 18 [37]%.		RO/PO check if SI can be terminated.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to ES-1.1.			US makes transition to ES-1.1, informs crew.
	SI reset. CIA reset. CIB reset.		US directs RO to reset SI and CIA.
	Two HHSI pumps running.		US directs RO to secure one HHSI pump.
	One HHSI pump running.		RO secures one HHSI pump.
	1AE and 1DF 4KV stub busses energized. CCR pumps in P-T-L.		PO re-energizes stub busses.
Report 8N22 and 9P21 closed.	Aux RW Pumps in P-T-L. CNMT air recirc fans in P-T-L. CRDM shroud fans in P-T-L. PRZR heaters 2A and 2B in P-T-L. CNMT instrument air compressors in P-T-L.		
IRF EPS138 (0 0) 1 IRF EPS140 (0 0) 1	480V stub busses energized.		RO/PO directs 480V stub busses energized.
	Automatic cold leg recirc change over reset. Chiller verified in service.		RO resets automatic cold leg recirc change over (both trains). PO starts CNMT instrument air compressors.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	TV-1CC-110D and F2 open.		PO opens containment recirc cooling coils AC/RW outlet.
	TV-1CC-110E2 and E3 open.		PO opens containment recirc cooling coils AC inlet containment isolation valves.
	CNMT instrument air compressor running.		PO starts an available containment IA compressor.
	CNMT air header pressure > 85 psig.		
	RCS pressure stable or rising.		RO checks RCS pressure.
	MOV-CH-289 and 310 open.		RO establishes normal charging flow.
	FCV-CH-122 throttled to maintain Pressurizer level.		
	MOV-SI-867A through D shut.		RO isolates the BIT.
Terminate the drill in after the BIT is isolated.			