

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: 1LOT5 NRC Simulator Examination

SUBDIVISION: Simulator

SCENARIO TITLE/NO. Scenario #1

COMPUTER CODE FOR L.P. N/A

Revision No.	Date
1	7/26/02

Revision No.	Date

INSTRUCTIONAL SETTING: BVPS-1 Simulator

APPROXIMATE DURATION: . 1.5 Hours

PREPARED BY: Western Technical Services, Inc. 7/26/02

Date

REVIEWED BY: E. Ernfield 7/26/02

Date

APPROVED FOR IMPLEMENTATION:

Date

Facility:	<u>FENOC - BVPS Unit 1</u>	Scenario No.:	1	Op Test No.:	2002 NRC 01
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<u>Objectives:</u>	In accordance with plant procedures:				
<u>Initial Conditions:</u>	Power 75%. IC-171.				
<u>Turnover:</u>	FW-P-3A OOS. Reduce power to remove FW-P-1B from service. Severe weather expected.				
<u>Critical Tasks:</u>	E-0.F, Establish AFW Flow ECA-3.1.B, Cooldown RCS				
Event No.	Malf. No.	Event Type*	Event Description		
1		R (RO) N (US) N (PO)	Power reduction at normal rate.		
2	FWM01B	C (PO) C(RO) C (US)	Trip of main feed pump.		
3	PRS06A	I (RO) I (US)	Pressurizer controlling level channel fails low.		
4	MSS14C	I (PO) I (US)	SG 'B' controlling steam flow transmitter fails low.		
5	FWM07B MSS07 MSS12B INH20 INH21	M (All) C (PO) C (US)	SG 'B' feedwater control valve fails shut requiring a Rx Trip. Condenser steam dumps fail to operate. SG 'B' atmospheric dump fails open on Rx Trip. AFW pumps fail to auto start (manual start available).		
6	RCS03B	M (All)	SG 'B' tube rupture of 500 gpm (ruptured/faulted).		

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

Scenario Description:

The Crew will lower power in preparation for removing a main feed pump from service; however, when power has been lowered to approximately 70%, the feed pump 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 causing letdown to isolate, charging flow to increase, and actual Pressurizer level to rise. After directing actions to restore Pressurizer level control, the Unit Supervisor will refer to Technical Specifications to address the failed channel.

After letdown is re-established, a controlling steam flow transmitter on SG 'B' fails low requiring operator action to take manual control of the SG feedwater regulating valve to avoid a reactor trip. After stabilizing SG level, the same feedwater regulating valve fails closed resulting in a reactor trip.

Following the reactor trip, the steam dump valves fail to operate resulting in a high SG pressure and the SG 'B' atmospheric dump valve opens and sticks open (faulted SG).

Additionally, the operable motor driven AFW pump and the turbine driven AFW pump fail to automatically start, but can be started manually by the operator.

A 500 gpm SG tube rupture then occurs resulting in a ruptured and faulted SG.

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

INITIAL CONDITIONS:

- The plant is at 75% power.
- Tavg is 569°F.
- RCS boron concentration is 1115 ppm.
- Control Bank "D" is at 190 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 to remove FW-P-1B from service ASAP (1% per 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. 1OM-52.4.B, Load Following

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, the 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 $T_{avg} - T_{ref}$.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #2

After power is lowered to 70%
IMF FWM01B

FW-P-1B trips.

- A7-37, SG Feed Pump Auto Stop
- A7-39, SG Feed Pump Disch Flow Hi
 Start 2nd Pump

PO recognizes feed pump trip and informs US.

US refers to ARP's as time permits.

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

PO decreases turbine load at 5% per minute.

RO continues RCS boration to maintain Tavg-Tref.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #3

After plant conditions have stabilized:

IMF PRS06A

PZR level transmitter LT-RC-459 fails low.

- A4-4, PZR Control Level Deviation Low
- A4-3, PZR Control Level Low.

LCV-CH-460A, TV-CH-200A, B, C close and PZR heaters turn off.

Letdown isolates and actual PZR level rises.

Level alarms clear, charging flow begins decreasing, high flow alarm clears.

Continue with next event when letdown has been reestablished.

RO recognizes problem with PZR level channel, informs US.

US refers to ARP and 10M-6.4.IF, Attachment 1.

RO informs US that LT-RC-459 failed low.

US directs Operator to defeat level control input with PZR level channel and recorder selector switches per 10M-6.4.IF, Attachment 1.

RO informs US that Channels 460 and 461 are selected.

US directs Operators to re-establish normal letdown and re-energize PZR heaters.

US refers to T.S. Table 3.3-1, Item 11 to determine action required to trip bistables within 6 hours.

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

"B" SG Steam Flow Transmitter
 [FT-MS-484] fails low.

MSS14C, 0, 0

FT-MS-484 fails low.

- A7-50, Loop 2 Feed > Stm

Feedwater flow decreases causing SG
 levels to decrease.

SG level stabilizes.

PO determines which channel has
 failed by comparing with other steam
 flow indicators.

US determines that 10M-24.4.IF,
 Attachment 3 is to be implemented.

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.

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

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

IMF FWM07B

FCV-FW-488 fails closed causing a loss of feedwater flow to the "B" SG.

PO acknowledges alarms associated with loss of feedwater flow to "B" SG.

PO identifies and reports valve closure to Crew.

PO attempts to manually open the valve (failed, will not open).

PO reports valve will not open.

US acknowledges reports from Crew.

US directs a manual reactor trip due to rapidly degrading plant conditions.

IMF MSS07

Following the reactor trip, steam dump valves fail to operate, resulting in the SG atmospheric dump valves opening.

IMF MSS12B

"B" SG ADV failure and steam break in Main Steam Valve Room.

Reactor trip, turbine trip.

RCS pressure drops.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			RO and PO commence immediate actions of E-0, US references E-0 to verify immediate actions.
	Reactor trip and bypass breakers open, neutron flux decreasing. Rod bottom lights lit. Rod position indication at "0".		RO verifies reactor trip.
	Turbine tripped. Throttle valves and governor valves closed.		PO verifies turbine trip.
			RO sounds standby alarm.
	Depress reheater controller, reset push-button. Reheat flow control and block valves closed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
	AE and DF busses energized.		PO verifies AE and DF busses energized.
	Any SI annunciator. SI actuation status lights.		RO checks if SI is actuated.
			RO initiates manual Safety Injection.
	EDG's running.		PO verifies EDG's running.
	All red marked SIS valve indicating lights lit.		RO/PO verify SI system status.
	Two HHSI pumps running.		
	FI-SI-943 indicates flow.		

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
INH20, INH21	LHSI pumps running. FW-P-3B and FW-P-2 not started automatically.		PO determines that no AFW Pumps are running. PO informs US that none of the AFW pumps are running.
CRITICAL TASK #1: Crew establishes the minimum required AFW flow rate to the SG's before transition out of E-0.	FW-P-3B and FW-P-2 started and running.		PO manually starts FW-P-3B and FW-P-2.
As Outside Operator, notify the Control Room that an ADV on "B" main steam line is open and blowing steam.	MOV-FW-151 "A" through "F" open. RPRW pumps running. CCR HX pressure > 20 psig. All indicating lights with orange marks lit. All indicating lights with green marks lit. All indicating lights with yellow marks lit. CIB and Containment Spray not required.		PO/RO verify AFW status. RO/PO verify RW System in service. RO/PO verify CIA. RO/PO verify FWI. RO/PO verify MSLI. RO verifies CIB and Containment Spray not required.
	CCR pumps running.		RO verifies CCR status.
	SR detector selector switches in normal.		RO verifies SR detector HV selector switches in normal.

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	AFW flow > 325 gpm.		PO verifies AFW flow greater than 325 gpm.
	Station instrument air header pressure > 100 psig.		PO verifies IA header pressure greater than 100 psig.
	RCS T _{avg} decreasing.		PO verifies RCS T _{avg} stable at or trending to 547°F; PO reduces AFW flow to 355 gpm.
	All yellow marked SLI valve indicators lit.		Crew performs a SLI due to RCS cooldown.
	PORV's closed.		RO checks PZR PORV's, safeties and spray valves.
	Safeties closed.		
	Spray valves at zero demand.		
	Power available to PORV MOV's.		
	PORV MOV's open with associated PORV's in automatic.		
	RCP's running.		RO checks if RCP's should be stopped.
	RCS/SG D/P > 150 psid.		
	CCR flow normal.		
	"B" SG is faulted as indicated by pressure difference between "B" SG compared to "A" and "C" SG's.		PO checks if SG's are faulted.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to E-2.	Control Room dampers shut. Timers running, Control Room pressurizing.		US exits E-0 at Step 22 and enters E-2.
When requested as U2 Operator, report 2HVC*MOD201A - D closed and 2HVC*MOD204A, B closed.	2HVC8MOD201A - D closed. 2HVC*MOD204A, B closed.		US directs STA to monitor status trees.
"B" SG tube rupture (500 gpm) IMF RCS03B	Valve indicators with yellow marks lit. "A" and "C" SG pressures stable. "B" SG pressure dropping uncontrollably.		PO initiates CREBAPS, and verifies system activated.
Report valves status to Control Room WR level increasing slowly without feedwater flow.	FCV-FW-488 closed. FCV-FW-489 closed. MOV-FW-151C and D closed. PCV-MS-101B open.		PO verifies CREBAPS actuated in U2 by requesting U2 CREBAPS status.
	"B" SG level rising in an uncontrolled manner. PZR level and pressure decreasing.		Crew verifies steam line isolation.
			PO checks for any non-faulted SG.
			PO identifies "B" SG as faulted.
			PO closes/verifies "B" MFRV closed.
			PO closes/verifies "B" BFRV closed.
			PO closes MOV-FW-151C and D.
			PO attempts to manually close PCV-MS-101B.
			PO directs Operator to close MS-16 and to open MS-17.
			Crew checks if SG tubes are intact.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to E-3.	CREBAPS actuated.		US exits E-2 and enters E-3.
	All RCPs running. CCR flow, RCS/SG D/P > 150 psig.		US directs Operators to verify CREBAPS actuated.
	"B" SG ruptured.		RO checks if RCP's should be stopped, does not stop RCP's.
	"B" SG atmospheric dump valve in manual, valve remains open.		US identifies "B" SG as the ruptured SG based on Operator reports.
	RHR valve closed.		US directs Operators to isolate flow from the "B" SG.
	MS-16 shut.		US directs operator to locally isolate steam dump valve.
	TV-MS-111B shut.		PO checks ruptured SG NR level, verifies AFW flow to "B" SG secured.
	"B" SG main steam trip, bypass and non-return valves shut.		PO checks ruptured SG pressure > 380 psig.
	AFW secured to "B" SG.		PO verifies station instrument air header pressure > 100 psig.
	"B" SG pressure > 380 psig.		
	Station instrument air header pressure > 100 psig.		

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Target temperature determined based on ruptured SG pressure.		US determines target temperature and initiates cooldown. STA trends cooldown rate.
	Cooldown using "A" and "C" SG atmospheric relief valves.		Crew initiates RCS cooldown at maximum rate to the target temperature.
	RCS pressure < 1950 psig.		RO blocks steamline SI when RCS pressure is below 1950 psig.
	Average of the 5 highest TC's at target temperature.		Crew stops RCS cooldown at target temperature.
	Intact SG's < 13% NR level.		PO checks intact SG level > 13% NR, maintains AFW flow > 355 gpm.
	PORV's closed. Power available to PORV block valves, all PORV block valves open.		RO checks PORV's and block valves, power available and closed.
	SI reset.		US verifies SI, CIA and CIB reset.
	CIA and CIB reset.		
	CNMT IA header pressure > 85 psig.		PO checks CNMT IA available.
	LHSI pumps stopped and in automatic.		US verifies RCS pressure > 300 psig. Directs RO to stop LHSI pumps.
	Cooldown complete.		US verifies RCS at target temperature.
	"B" SG pressure < 250 psig above intact SG's.		Crew checks ruptured SG pressure > 250 psig above intact SG's.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to ECA-3.1.			US exists E-3 and enters ECA-3.1.
	RWST > 19 feet.		RO checks RWST > 19 feet.
	Previously performed.		RO verifies CNMT vents and drains isolated; SI, CIA and CIB reset.
	Previously performed.		PO verifies stub busses energized.
	Previously performed.		PO verifies CNMT instrument air available.
	All busses energized.		PO verifies all AC busses energized by offsite power.
			RO places all PZR heaters in Pull-To-Lock.
	No Quench Spray Pumps running.		RO check if any Quench Spray Pumps running.
	RCS pressure greater than 250 psig.		RO checks if LHSI pumps should be stopped.
	LHSI pumps stopped.		
	"B" SG steam and feed flow isolated previously.		PO checks ruptured SG NR level and verifies "B" SG isolated.
	Aux. Building and safeguards radiation – consistent with pre-event values. Obtain samples as listed in Step 9.b.		US initiates evaluation of plant status.
	"B" SG previously identified and isolated.		PO checks if any SG's are faulted.
	"A" and "C" SG's intact.		

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>CRITICAL TASK #2: Crew initiates cool down of the RCS to cold shutdown conditions at the highest achievable rate but less than 100°F per hour.</p> <p>Terminate drill when cooldown is started in ECA-3.1.</p> <p>Collect and review logs after allowing crew time to complete.</p> <p>Erase any VOND markings.</p>	<p>SG NR level > 13%.</p> <p>Station instrument air header pressure > 100 psig.</p> <p>Do not exceed 100°F/hour cooldown in RCS cold leg.</p>		<p>PO checks intact SG levels and maintains NR level > 13%, or AFW flow > 355 GPM.</p> <p>PO verifies station instrument air header pressure > 100 psig.</p> <p>PO commences cooldown using "A" and "C" SG atmospheric relief valves at < 100°F per hour.</p> <p>US directs Chemistry to obtain hourly RCS boron samples.</p>

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PROGRAM TITLE: 1LOT5 NRC Simulator Examination

SUBDIVISION: Simulator

SCENARIO TITLE/NO. Scenario #2

COMPUTER CODE FOR L.P. N/A

Revision No.	Date
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Revision No.	Date

INSTRUCTIONAL SETTING: BVPS-1 Simulator

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: Western Technical Services, Inc. 7/26/02

_____ Date

REVIEWED BY: E. Emfield 7/26/02

_____ Date

APPROVED FOR IMPLEMENTATION:

_____ Date

Facility:	<u>FENOC BVPS Unit 1</u>	Scenario No.:	2	Op Test No.:	2002-NRC-01
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<u>Objectives:</u>	In accordance with plant procedures:				
<u>Initial Conditions:</u>	97% power.				
<u>Turnover:</u>	FW-P-3A OOS. Raise power to 100%. Severe weather is expected.				
<u>Critical Tasks:</u>	E-0.Q, Turbine Trip E-0.D, Manual Safety Injection E-1.C, Trip All RCPs				

Event No.	Malf. No.	Event Type*	Event Description
1		N (US) N (PO) R (RO)	Power ascension at normal rate.
2	NIS03D	I (RO) I (US)	PR channel N44 summing amplifier fails high causing control rods to step in.
3	IOR X06A087P	I (RO) I (US)	Letdown backpressure regulating valve fails shut.
4	CCW03A IOR X16A056P CCW08B	C (PO) C (US) C (All)	'1A' CCR pump trips. CCR pressure control valve fails open. CCR supply leak to '1B' RCP (ramp to 500 gpm).
5	RCS09B INH48 RCS02B SIS10A SIS10B	M (All) C (PO) C (US) M (All) C (RO) C (US)	RCP 'B' locked rotor causes automatic Rx trip. Main turbine fails to trip automatically (manual trip available). RCS loop 'B' 900 gpm LOCA. Failure of automatic safety injection (both trains).

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

Scenario Description

The Crew will perform a normal power ascension at the rate of 12% per hour.

After power has been raised to 100% and the control rods are placed in automatic, power range channel N-44 summing amplifier output fails high causing inadvertent, automatic rod motion. Operator action is required to place rod control in manual to stop the inward rod motion. After stabilizing the plant, the Unit Supervisor will refer to Technical Specifications to verify all required actions have been performed.

After completing actions for the failed power range channel, the letdown backpressure regulating valve fails closed causing a loss of normal letdown, increased pressure in the letdown line, and lifting of the letdown relief valve with associated alarms.

After letdown is restored with the controller in manual, a component cooling pump trips and the pressure control valve fails open requiring operator action to take manual control to restore system pressure.

A component cooling line leak then occurs in the supply line to RCP 'B' and increases to 500 gpm requiring operator action to locate and isolate the leak. Before the reactor can be manually tripped; however, RCP 'B' will experience a locked rotor resulting in an automatic reactor trip.

Following the reactor trip, the main turbine will fail to automatically trip requiring operator action to manually trip the turbine.

A 900 gpm LOCA occurs along with a failure of automatic safety injection Train 'A' and Train 'B'. Operator action is required to manually initiate safety injection.

The expected procedure flow path is E-0 → E-1.

INITIAL CONDITIONS:

- The plant is at 97% power.
- Tavg is 575°F.
- RCS boron concentration is 1055 ppm.
- Control Bank "D" is at 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% at 12% per hour and place control rods in automatic.
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

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US assumes control and directs Operators to increase reactor power to 100% IAW 10M-52.4.A, Step A.118.

EVENT 1

Raise power to 100%.

Turbine load and reactor power increasing at 12% per hour.

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.

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EVENT 2

After power has been raised to 100% and control rods are placed in automatic, insert:

NIS03D (0 0)

PR Channel N-44 Fails High

N-44 power indications upscale.

- A4-69, Neutron Flux Rate High
- A-465, NIS PR High Setpoint
Neutron Flux High

Control rods inserting.

Turbine load decreasing.

RO determines failed instrument.

US directs RO to place control rods in Manual.

RO places rod control in Manual.

US refers to AOP-1.2.1C.

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

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

PO turns Rod Stop Bypass switch to Bypass for N-44.

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PO turns the Comparator Channel Defeat switch to N-44.

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

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

US refers to T.S. 3.2.4, and Table 3.3-.1, Item 2, Action 2.

Note:

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

Continue with next event at Lead Examiner's discretion.

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EVENT 3

IOR X06A087P (0 0) 1

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

- A3-107, NRHX Disch Press High
- A2-3F, Letdown Flowpath Trouble

RO notes indications and alarms.

RO notifies US. Refers to ARP.

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-1CH-145.

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EVENT 4

IMF CCW03A

IOR X16056P (5 0) 0

CCW08B, 500 gpm, 600 sec.

Running CCR Pump trips and PCV-1CC-100 Fails Open

- A3-83, React. Cool PP Upper BRG Lube Oil Cool Water Flow Low
- A3-76, React Cool PP Motor Bearing Temp High.
- A6-35, Primary Water Supply Press Low.

Decreasing CCR surge tank level.

Increasing Containment sump levels.

RCP "C" motor and bearing temperatures increasing.

Level control in manual with maximum makeup.

PO identifies trip of running CCR pump.

PO identifies PCV-1CC-100 is full open.

US refers to 10M-15.4.AAE and directs PO to place PCV-1CC-100 in manual and raise CCR pressure.

Crew identifies and reports leak in CCR system.

Crew determines that CCR header leak is inside containment.

Crew performs actions per 10M-15.4.AAC.

Check CCR system status.

Place surge tank level control valve LCV-1CC-100A in manual and adjust control signal to maximize makeup to surge tank.

Monitor RCP motor bearing upper and lower temperatures for RCP's.

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	Non-essential loads isolated.		<p>Crew attempts to locate the leak.</p> <p>US may direct a reactor shutdown.</p> <p>Crew: If any RCP temperatures are approaching limits (200°F) OR operating CCR pumps discharge pressure and current indicates cavitation:</p> <ul style="list-style-type: none">• Manually trip the reactor.• Trip all RCPs.• Enter E-0, Reactor Trip Or Safety Injection.

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EVENT 5

Prior to the Crew's decision to manually trip the reactor, insert:

RCP "B" Locked Rotor with Auto Turbine Trip

IMF RCS09B

INH48 (Pre-loaded)

The main turbine will fail to trip automatically following the reactor trip.

RCS loop 2 flow indication low (< 90%).

- Loop 3 R.C. LOW FLOW Status Panel lights lit (Chan 1 RED, Chan II WHITE, Chan III BLUE)

Crew identifies and reports trip of RCP "B" with loss of RCS loop flow.

After RCP "B" locked rotor, insert:

RCS Loop "B" 900 GPM LOCA

IMF RCS02B, 900 GPM

Crew enters E-0.

Reactor fails to trip automatically.

Neutron flux decreasing. Rod bottom lights lit, Rod position at "0".

Plant standby alarm sounded

Throttle and governor valves open reheat stop and intercept valves open.

RO/PO perform Immediate Operator Actions of E-0:

- RO determines reactor failed to automatically trip and manually trips the reactor.
- Verify Reactor Trip.
- Alert Plant Personnel.
- Verify Turbine Trip.

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>CRITICAL TASK #1: Crew manually trips the turbine before a severe (orange path) challenge develops on either the Subcriticality or Integrity CSF.</p>	Reheat flow control valves and MOV's open.		PO reports main turbine failed to trip.
	Steam dumps to OFF.		US directs PO to trip the turbine.
	Following manual turbine trip, throttle and governor valves closed, reheat stop and intercept valves closed.		PO trips the turbine manually.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
<p>SIS10A, SIS10B (Pre-loaded)</p>	AE and DF busses energized.		PO verifies power to AC emergency busses.
	EDG's running.		PO verifies both EDG's are running.
<p>CRITICAL TASK #2: Crew manually actuates at least one train of SIS-actuated safeguards before transition to any ORP.</p>	CH-P-1A and CH-P-1B running.		RO determines SI failed to actuate automatically.
	LHSI pumps running.		RO manually actuates both SI trains.
			RO verifies two charging/HHSI pumps are running.
			RO checks HHSI to BIT flow indicated.
			RO/PO checks both LHSI pumps are running.

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	<p>Motor driven AFW pump "3B" running unless previously placed in P-T-L.</p> <p>Turbine driven AFW pump is running.</p>		<p>RO/PO check all valves indicating lights with RED marks are LIT.</p> <p>PO determines "B" Motor Driven AFW pump is running.</p> <p>PO determines Turbine driven AFW pump is running by verifying AFW steam supply trip valves are open..</p> <p>PO verifies all SG AFW throttle valves are full open.</p>
	<p>RPRW pumps running.</p> <p>CCR Hx pressure > 20 psig.</p> <p>All indicating lights with orange marks lit.</p> <p>All indicating lights with green marks lit.</p> <p>All indicating lights with yellow marks lit.</p> <p>All indicating lights with red marks lit.</p>		<p>RO/PO verify RW System Status.</p> <p>RO/PO verify 2 CCR pumps running.</p> <p>RO/PO verify CIA.</p> <p>RO/PO verify FWI.</p> <p>RO/PO verify FWI.</p> <p>RO/PO verify MSLI.</p> <p>RO/PO verify SI.</p>
	<p>CCR pumps running.</p> <p>SR detector selector switches in Normal.</p>		<p>RO/PO verify CCR Status.</p> <p>RO verifies SR detector HV Selector Switches in Normal.</p>
	<p>AFW flow > 325 gpm.</p>		<p>PO verifies AFW flow greater than 325 gpm.</p>

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Station instrument air header pressure > 100 psig.		PO checks IA header pressure > 100 psig.
	PORV's closed.		PO verifies RCS Tavg stable or trending to 547°F.
	Safeties closed.		RO checks PZR PORV's, safeties and spray valves.
	Spray valves at zero demand.		
	Power available to PORV MOV's.		
	Power available to PORV MOV's.		
	PORV MOV's open with associated PORV's in automatic.		
	D/P between RCS pressure and highest SG pressure < 200 psid.		RO checks if RCP's should be stopped.
	All RCP's stopped.		RO stops all RCP's.
	No SG pressures dropping in an uncontrolled manner.		PO checks if SG's are faulted.
	No SG levels rising in an uncontrolled manner.		PO checks if SG tubes are intact.
	RCS pressure and PZR level decreasing rapidly.		US determines RCS is <u>not</u> intact.
			US exits E-0 and enters E-1.

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When requested as U2 Operator, report 2HVC*MOD201A - D closed and 2HVC*MOD204A and B closed.	Control Room dampers shut. Timers running, Control Room pressurizing.		PO initiates CREBAPS and verifies system activated. PO verifies CREBAPS activated in U2 by requesting U2 CREBAPS status.
CRITICAL TASK #3: Crew trips all RCP's when RCS to highest S/G D/P criteria is exceeded and SI flow is verified prior to exiting E-1.	D/P between RCS pressure and highest SG pressure < 200 psid.		RO checks if RCP's should be stopped.
	All RCP's stopped.		RO stops all RCP's if not stopped previously.
	No SG pressures dropping in an uncontrolled manner.		PO checks if any SG's are faulted.
	AFW flow > 325 gpm.		PO maintains AFW flow > 355 GPM until NR SG level is > 13%.
	Instrument air header pressure > 100 psig.		PO checks IA header pressure > 100 psig.
	PORV's closed.		RO checks PZR PORV's, safeties and spray valves.
	Safeties closed.		
	Spray valves at zero demand.		
	Power available to PORV MOV's.		

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>Terminate drill.</p> <p>Collect and review logs after allowing Crew time to complete.</p> <p>Erase any VOND marks.</p>	<p>PORV MOV's open with associated PORV's in automatic.</p> <p>No SG levels rising in an uncontrolled manner.</p> <p>RCS pressure and PZR level lowering.</p> <p>A1-2H lit. CNMT pressure > 8 psig. All indicating lights with blue CIB marks LIT.</p> <p>Both trains of SI reset.</p> <p>CIA reset.</p> <p>RCP pressure dropping.</p> <p>RCP pressure dropping.</p>	<p>PO checks if SG tubes are intact.</p> <p>RO checks if SI flow should be terminated.</p> <p>RO checks CIB CNMT spray status.</p> <p>RO resets SI.</p> <p>RO resets CIA.</p> <p>RO checks if LHSI pumps should be secured.</p> <p>RO checks RCS Tavg stable at or trending to 547°F.</p> <p>RO checks SG pressure stable or rising.</p> <p>RO checks RCS pressure stable or dropping.</p>	

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: 1LOT5 NRC Simulator Examination

SUBDIVISION: Simulator

SCENARIO TITLE/NO. Scenario #1

COMPUTER CODE FOR L.P. N/A

Revision No.	Date
1	7/26/02

Revision No.	Date

INSTRUCTIONAL SETTING: BVPS-1 Simulator

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: Western Technical Services, Inc. 7/26/02
_____ Date

REVIEWED BY: E. Emfield 7/26/02
_____ Date

APPROVED FOR IMPLEMENTATION: _____ Date

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: 1LOT5 NRC Simulator Examination

SUBDIVISION: Simulator

SCENARIO TITLE/NO. Scenario #3

COMPUTER CODE FOR L.P. N/A

Revision No.	Date
0	7/26/02

Revision No.	Date

INSTRUCTIONAL SETTING: BVPS-1 Simulator

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: Western Technical Services, Inc. 7/26/02

_____ Date

REVIEWED BY: E. Emfield 7/26/02

_____ Date

APPROVED FOR IMPLEMENTATION: _____ Date

Facility:	<u>FENOC BVPS Unit 1</u>	Scenario No.:	3	Op Test No.:	2002-01
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<u>Objectives:</u>	In accordance with plant procedures:				
<u>Initial Conditions:</u>	7% power.				
<u>Turnover:</u>	FW-P-3A OOS. Continue the plant startup. Severe weather is expected.				
<u>Critical Tasks:</u>	E-0.A, Trip Reactor; E-0.O, Close Containment Isolation Valves				
	E-0.E, Manually Start Quench Spray Pump				
Event No.	Malf. No.	Event Type*	Event Description		
1		N (PO) N (US)	Shift in-service turbine plant component cooling pumps.		
2		R (RO) N (US)	Plant startup.		
3	NIS07A	I (RO) I (US)	Intermediate range channel instrument power fuse blows.		
4	PRS013	I (RO) I (US)	Pressurizer level controller fails low.		
5	MSS11	I (PO) I (US)	Steam pressure channel fails high causing steam dump valves to open.		
6	MSS-1C CRF-12A	M (All) C (RO) C (US)	SG 'C' faulted inside containment. Automatic reactor trip failure (manual trip available).		
	SIS-2A	C (RO) C (US)	Quench spray pump '1A' trips 15 seconds after start.		
	INH43	C (RO) C (US)	Quench spray pump '1B' fails to start automatically (manual start available).		
	INH50	C (RO) C (US)	Automatic containment isolation phase 'B' failure (manual available).		

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

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.

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:

- The plant is at 7% power.
- Tavg is 549°F.
- RCS boron concentration is 1868 ppm.
- Control Bank "D" is 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	24 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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Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>When the shift turnover is complete, place the Simulator to RUN and commence the drill.</p> <p><u>EVENT #1</u></p> <p>Shift in-service CCT Pumps</p>	<p>Simulator running.</p>		<p>Crew assumes control of the unit.</p>
	<p>1CC-P-3B running.</p>		<p>PO shifts in-service CCT Pumps.</p> <p>Verify 1CC-P-3B aligned for standby operation.</p> <p>Direct local operator to verify 1CC-P-3B has adequate oil level.</p> <p>Start 1CC-P-3B.</p>
	<p>1CC-P-3A stopped.</p>		<p>Direct local operator to verify proper operation.</p> <p>Stop 1CC-P-3A and place control switch in automatic.</p>

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #2

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.

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.

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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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 Channel Trip

IMF NIS07A 0

Rod block alarms actuated. Loss of detector/compensating voltage.

- A4-93, NIS Intermediate Range Loss Of CH I Detector Voltage
- A4-94, NIS Intermediate Range Loss Of CH I Compensation Voltage

RO acknowledges alarms and performs a channel check to identify NI-36 as the failed channel.

US refers to AOP-1.2.1B. Verifies Unit is in Mode 1 and goes to step 4.

Crew verifies power still greater than 10% and intermediate range trip is still blocked.

Crew places a caution tag on source range channels.

US references Technical Specification 3.3.1.1.

US directs the Crew to continue with the Unit startup.

BEAVER VALLEY, JWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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RO withdraws rods to raise reactor power to 15 to 18%.

RO/PO maintain reactor power, T_{avg} , and SG level in preparation for Unit synchronization.

BEAVER VALLEY POWER STATION
Training Administrative Manual

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

IMF PRS013

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

PT-1MS-464 Fails High

Condenser steam dump valves open.

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

US directs PO to take manual control of steam dump valve controller.

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Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Steam dump valves closed.		<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	SG "C" Main Steam Line Break Inside Containment		
	Containment temperature and pressure rising.		US directs manual reactor trip due to rising containment pressure.
CRF-12A (pre-loaded)	Reactor fails to automatically trip.		RO and PO commence Immediate Operator Actions of E-0.
			RO informs US of failure of reactor trip and first out annunciators.
			US directs RO to manually trip the reactor.
	Reactor trips, turbine trips, RCS pressure drops.		RO manually trips reactor.
CRITICAL TASK #1: Crew manually trips the reactor before performing the mitigation strategy of FR-S.1.	Reactor trip and bypass breakers open, neutron flux decreasing. Rod bottom lights lit. Rod position indication at "0".		RO verifies reactor is tripped.
			RO sounds standby alarm and announces reactor trip.
	Throttle and governor valves closed, reheat stop and intercept valves closed.		PO verifies turbine tripped.

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Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Reheat flow control valves and MOV's closed.		PO ensures reheat steam isolation by depressing reheat controller reset pushbutton and checks MOV-100A & B shut.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
	AE and DF busses energized.		PO verifies emergency busses energized.
	Any SI annunciator. SI actuation status lights. SI actuated by low steam line pressure.		RO checks if SI has actuated, reports SI has actuated.
	Both EDG's running.		PO verifies EDG's running.
	HHSI pumps running.		RO/PO verify SI system status.
	LHSI pumps running.		
	All red marked SI valve indicating lights lit.		
	FW-P-3B running. MOV-FW-151A through F open.		PO verifies AFW status.
	RPRW pumps running.		RO verifies RW System in service.
	CCR Hx RW pressure > 20 psig.		
INH50	Failure of Automatic Phase "B" Containment Isolation		

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>CRITICAL TASK #2: Crew closes Cnmt. isolation valves such that at least one valve is closed on each penetration before the end of the drill.</p>	<p>All indicating lights with orange CIA marks lit. CIB failed to actuate.</p>		<p>RO/PO verify CIA, determine that it has actuated and report CIA status to the US.</p>
	<p>CIB actuated. All indicating lights with orange CIB marks lit.</p>		<p>RO manually actuates CIB. RO/PO verify CIB alignment.</p>
<p>INH43</p> <p>CRITICAL TASK #3: Crew manually actuates at least the minimum required complement of containment cooling equipment before a red path challenge develops to the Containment CSF.</p>	<p>All indicating lights with green FWI marks lit.</p>		<p>RO/PO verify FWI.</p>
	<p>Containment pressure increasing, steam line pressure dropping.</p>		<p>RO/PO determine MSLI is required.</p>
	<p>All indicating lights with yellow marks lit.</p>		<p>RO/PO verify MSLI.</p>
	<p>Quench spray pump "B" fails to start automatically.</p>		<p>RO/PO reports QSS pump "B" failed to auto start.</p>
<p>Quench spray pump running.</p>		<p>US directs manual start of QSS pump "B". RO/PO manually starts QSS pump "B".</p>	

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>SIS-2A</p>	<p>QS pump 'A' trips 15 seconds after starting.</p> <p>SR detector high voltage selector switches in normal.</p> <p>AFW flow > 325 gpm.</p> <p>Station instrument air header pressure > 100 psig.</p> <p>T_{avg} < 574°F and dropping rapidly. (SLI already verified.)</p> <p>PORV's closed.</p> <p>Safeties closed.</p> <p>Spray valves at zero demand.</p> <p>Power available to PORV MOV's.</p> <p>PORV MOV's open with associated PORV's in automatic.</p> <p>RCP's stopped after CIB.</p>		<p>RO reports Quench Spray status to US.</p> <p>RO verifies SR detector high voltage selector switches in normal.</p> <p>PO verifies total AFW flow greater than 325 gpm.</p> <p>PO verifies station instrument air header pressure > 100 psig.</p> <p>RO determines RCS temperature is dropping.</p> <p>US directs personnel to perform emergency safety function checklists as time permits.</p> <p>RO checks PZR PORV's and spray valve's status.</p> <p>RO stopped RCP's after CIB actuation, reports status to US.</p>

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to E-2.	<p>“C” SG pressure is decreasing due to steam line rupture in containment.</p> <p>CREBAPS actuated on CIB.</p> <p>All five Control Room bottled air red lights lit.</p> <p>Both emergency ventilation timers running.</p> <p>Control Room intake and Exhaust dampers closed.</p>		<p>PO checks SG pressures and reports “C” SG as faulted to the US.</p> <p>US exits E-0 and enters E-2.</p> <p>PO verifies CREBAPS actuated.</p>
When requested as U2 Operator, report 2HCV*MOD201A - D closed and 2HCV*MOD204A, B closed.	<p>Yellow marks lit.</p> <p>“A” and “B” SG pressures stable.</p> <p>“C” SG pressure dropping uncontrollably.</p> <p>FCV-1FW-498 closed.</p> <p>FCV-1FW-499 closed.</p> <p>MOV-FW-151A and 151B closed.</p> <p>FW-P-2 aligned to SG’s “A” & “B”.</p>		<p>PO request Unit 2 Control Room to check dampers closed.</p> <p>RO/PO verifies steamline isolation.</p> <p>PO checks for non-faulted SG.</p> <p>Crew identifies “C” SG as faulted.</p> <p>PO closes/verifies “C” MFRV and BFRV closed.</p> <p>PO closes MOV-FW-151A and 151B.</p> <p>PO verifies turbine driven AFW pump steam supply.</p>

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>Crew transitions to ES-1.1, if SI termination criteria is satisfied.</p> <p>Use LOA's as required to close breakers.</p> <p>Report 8N22 and 9P21 closed.</p>	PCV-MS-101C closed.		Crew verifies "C" SG atmospheric dump valve closed.
	HCV-MS-104 closed.		Crew verifies RHR control valve closed.
	No SG level rising in an uncontrolled manner.		Crew checks if SG tubes are intact.
	SI reset.		RO resets SI.
	CIA reset.		RO resets CIA and CIB.
	CIB reset.		
	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.
	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.			

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	CNMT instrument air compressors in P-T-L.		
	480V stub busses energized.		RO/PO directs 480V stub busses energized.
	Automatic cold leg recirc change over reset.		RO resets automatic cold leg recirc change over (both trains).
	Chiller verified in service.		PO starts CNMT instrument air compressors.
	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.

BEAVER VALLEY POWER STATION
Training Administrative Manual

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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Collect and review logs after allowing Operators to complete them.

Erase any VOND markings.

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: 1LOT5 NRC Simulator Examination

SUBDIVISION: Simulator

SCENARIO TITLE/NO. Scenario #4

COMPUTER CODE FOR L.P. N/A

Revision No.	Date
0	7/26/02

Revision No.	Date

INSTRUCTIONAL SETTING: BVPS-1 Simulator

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: Western Technical Services, Inc. 7/26/02

_____ Date

REVIEWED BY: E. Emfield 7/26/02

_____ Date

APPROVED FOR IMPLEMENTATION: _____ Date

Facility:	<u>FENOC BVPS Unit 1</u>	Scenario No.:	<u>4</u>	Op Test No.:	2002-NRC-01
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<u>Objectives:</u>	In accordance with plant procedures:				
<u>Initial Conditions:</u>	48% power.				
<u>Turnover:</u>	FW-P-3A OOS. Raise power to 100%. Severe weather expected.				
<u>Critical Tasks:</u>	FR-S.1.C, Insert RCCAs E-0.I, Manually Start HHSI Pump E-1.C, Trip all RCPs				

Event No.	Malf. No.	Event Type*	Event Description
1		N (US) N (PO) R (RO)	Power ascension at normal rate.
2	FWM-15A	I (PO) I (US)	SG feedwater level controller fails high.
3	TUR16	I (PO) I (RO) I (US)	Turbine impulse pressure transmitter fails high causing a load rejection.
4	PRS12 PRS03A	I (RO) I (US) C (RO) C (US)	Pressurizer pressure master controller fails high causing a PORV actuation and pressure decrease. PZR PORV leaks after lifting (block valve can be shut).
5	PRS05 CRF12A CRF12B SIS05A INH40	M (All) C (RO) C (US)	400 gpm Pressurizer vapor space leak (LOCA). ATWS HHSI pump trips on safety injection. Standby HHSI pump fails to auto start (manual start available).

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

Scenario Description:

After the Crew has raised power by 5%, a SG feedwater level controller fails high requiring the PO to take manual control to restore SG level back to program.

After SG level is stabilized, the turbine impulse pressure transmitter fails high resulting in a load rejection. The Crew must diagnose the failure and stop the load loss by taking manual control of the turbine EHC system. The Unit Supervisor will refer to Technical Specifications to determine the actions required as a result of the plant transient.

After conditions have been stabilized, the Pressurizer master controller fails high causing the following control channel actions: PORV opens, heaters turnoff; spray valves open, and RCS pressure decreases. Manual control of the Pressurizer master controller will fail to close the PORV and the RO should take alternate action to close the PORV. After closing, the PORV will leak requiring the crew to close its block valve to stop the leakage and meet the Technical Specifications action statement requirement.

After the PORV block valve has been closed a 400 gpm Pressurizer vapor space leak (LOCA) will result in a reactor trip condition; however, the reactor trip will fail leading to an ATWS.

As the Pressurizer vapor space leak continues, the running high head SI pump will trip on safety injection actuation and the standby high head SI pump will fail to automatically start, but can be manually started by the operator.

The expected procedure flow path is E-0 → FR-S.1 → E-0 → E-1.

INITIAL CONDITIONS:

- The plant is at 48% power.
- Tavg is 559°F.
- RCS boron concentration is 1213 ppm.
- Control Bank "D" is at 152 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 ago	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.

SCENARIO SUPPORT MATERIAL REQUIRED

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

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Training Administrative Manual

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

Raise power.

Reactor at 48%.

US assumes control and directs Operators to increase reactor power to 100% IAW 10M-52.4.A, Step A.118.

Turbine load and reactor power increasing at 12%/hr.

Crew reviews/agrees with reactivity plan. US approves for use. Crew begins power increase.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #2

"A" SG Feedwater Level Controller
Output Fails High

FCV-1FW-478 output fails high.

IMF FWM-15A

"A" SG feed flow rises. "A" NR level rises.

NOTE: Level deviation dependent on time of establishing normal MFRV control to restore "A" SG level.

- 47-42, Loop 1 Feedwater Flow Greater Than Steam Flow
- A7-45, Steam Generator 1A Level Deviation From Setpoint

A7-42 clears after FCV-1FW-478 in manual feed flow reducing.

PO notes problem with "A" SG level control valve FCV-FW-478, takes manual control and informs the US.

Crew refers to ARP's.

Crew determines that FCV-FW-478 output is failed high.

US directs PO to restore "A" SG level to program value.

US notifies I&C of FCV-FW-478 controller problem.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #3

Turbine EHC 1st Stage Impulse Pressure Transmitter Failure

PT-MS-216 output fails high.

ACTIVATE TUR16

Load rejection at rate of 2% per minute occurs. Reactor power starts to decrease and turbine governor valves slowly close.

Crew recognizes loss of load and inform US.

NOTE: AOP-1.35.2 expected student responses may not be performed if < 10% load is lost.

FCV-FW-478 in manual.

US directs Operators to stabilize the plant and refers to AOP-1.35.2.

US directs PO to control "A" SG level.

PO adjusts FCV-FW-478 as necessary to maintain "A" SG level at program value during the transient.

Rods inserting in automatic and Tav_g dropping to match Tref.

RO places control rods in automatic and checks auto rod insertion.

RO or PO sounds standby alarm and announces Unit 1 load rejection.

US references T.S. 3.1.3.6, 3.2.1 and 3.2.5.

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

Pressurizer Pressure Master
Controller Fails High

IMF PRS12

After PORV is open, insert:

IMF PRS03A

PORV opens, control heaters turn off,
spray valves open, RCS pressure
decreases rapidly.

- A4-11, Pressurizer Control Pressure Low
- A4-10, Pressurizer Control Press Deviation High
- A4-5, Pressurizer PORV Open
- A4-6, Pressurizer Safety Valve Or PORV Open
- A4-25, Pressurizer Power Relief Line Discharge Temp High

Manual control of PZR master controller
fails to close PORV.

PORV and spray valves closed. PZR
heaters on.

RO notes indications and alarms,
informs US.

US refers to ARP's.

RO notes failure of Pressurizer Master
Controller and informs US.

US directs RO to place PZR master
controller in manual, close spray
valves and PORV, and take manual
control of PZR heaters.

RO uses individual component controls
to shut spray valves and take manual
control of PZR heaters and close the
PORV.

US contacts I&C to investigate failure.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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RCS pressure continues to decrease due to PORV leakage. Charging flow increases.

PORV MOV block valve closed.

Crew identifies PORV is leaking.

US directs RO to close PORV MOV.

RO closes PORV MOV to stop leakage.

US references T.S. 3.4.11.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p><u>EVENT #5</u></p> <p>Pressurizer Vapor Space Leak (LOCA)</p> <p>IMF PRS05</p>	<p>RCS pressure continues to decrease due to vapor space leak. Charging flow remains high, CNMT dewpoint and pressure slowly increase.</p> <ul style="list-style-type: none"> • A4-72, Radiation Monitoring High-High • A4-71, Radiation Monitoring High • A4-11, Pressurizer Control Press Low • A3-58, Charging Pump Discharge Flow High-Low 	<p>RO monitors CVCS, identifies that RCS pressure is continuing to decrease.</p> <p>RO checks radiation levels.</p> <p>Crew identifies RCS leak and informs the US.</p> <p>US directs an emergency plant shutdown per AOP-1.5.1.</p> <p>Crew refers to reactivity plan and begins power reduction.</p> <p>US informs System Operator of power reduction.</p> <p>US directs STA to monitor RCS leakage rate.</p>	
<p>NOTE: Power reduction may occur at 2% or 5% per minute.</p>	<p>Power lowering.</p>		

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCS pressure dropping.		RO monitors CVCS for proper operation.
	Charging flow rising.		RO identifies that RCS pressure is dropping.
	CNMT dew point and pressure rising.		Crew continues to investigate source of RCS leakage.
			Crew identifies vapor space leak.
	RCS pressure dropping, CNMT pressure and temperature rising.		US directs a manual reactor trip.
CRF12A, CRF12B (pre-loaded)	Reactor not tripped.		RO trips the reactor.
			Crew identifies that the reactor failed to trip.
	Control rods not inserting.		RO depresses reactor trip pushbutton to trip the reactor.
Immediate action steps of FR-S.1.			US enters FR-S.1 and announces entry to Crew.
	Turbine tripped.		PO presses both turbine trip pushbuttons.
			RO/PO verify T_{ref} is decreasing.
	Control rods inserting.		RO places control rods in automatic and verifies rods are inserting.
			RO drives rods in manual after automatic rod motion stops.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>CRITICAL TASK #1: Crew inserts negative reactivity into the core by inserting RCCAs before completing the immediate actions steps of FR-S.1.</p>	<p>RTB "A" and RTB "B" open (after 30 second delay).</p>	<p>US dispatches Operator to locally trip the reactor.</p>	<p>US dispatches Operator to locally trip the reactor.</p>
<p>2 minutes after direction to locally trip the reactor, insert LOA's to open RTB's.</p>	<p>Control rods insert. Power decreases.</p>	<p>RO/PO sound the standby alarm and announce the reactor trip without scram.</p>	<p>RO/PO sound the standby alarm and announce the reactor trip without scram.</p>
	<p>RCP "B" tripped.</p>	<p>US directs SM to evaluate EPP.</p>	<p>After the trip breakers are open the Crew should trip RCP "B".</p>
	<p>Throttle and governor valves closed, reheat stop and intercept valves closed.</p>	<p>PO verifies turbine trip.</p>	<p>PO verifies turbine trip.</p>
	<p>Steam dumps in Off.</p>	<p>PO places steam dump control interlock switches in Off.</p>	<p>PO places steam dump control interlock switches in Off.</p>
	<p>Reheat flow control valves and MOV's closed.</p>	<p>PO ensures reheat steam isolation by depressing reheat controller reset pushbutton and checks MOV-100A & B shut.</p>	<p>PO ensures reheat steam isolation by depressing reheat controller reset pushbutton and checks MOV-100A & B shut.</p>
	<p>FW-P-3B and FW-P-2 are operating.</p>	<p>PO verifies AFW status.</p>	<p>PO verifies AFW status.</p>
	<p>MOV-FW-151A through F open.</p>	<p>RO initiates emergency boration.</p>	<p>RO initiates emergency boration.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
SIS05A	CH-P-1A trips on SI.		Verifies or starts a HHSI pump.
INH40	CH-P-1B fails to automatically start.		RO determines no HHSI pump running, informs US, and manually starts CH-P-1B.
CRITICAL TASK #2: Crew establishes flow from at least one high head ECCCS pump before transition out of E-0.	CH-P-1B started manually. MOV-1CH-350 open.		RO opens emergency boration valve.
	1CH-P-2A(B) running in fast speed.		RO starts inservice boric acid transfer pump in Fast speed.
	Boration flow > 30 gpm.		RO verifies emergency boration flow > 30 gpm.
	FCV-1CH-122 indicates > 75 GPM.		RO opens charging flow control valve to establish > 75 gpm flow.
	PZR pressure < 2325 psig.		RO verifies PRZ pressure < 2325 psig.
	Any SI annunciator. SI actuation status lights. SI actuated by low PZR pressure.		RO checks if SI has actuated, reports SI has actuated.
	AFW flow > 630 gpm.		US directs performance of first 11 steps of E-0, as time permits.
	Station instrument air header pressure > 100 psig.		PO checks intact SG levels > than 13% and AFW flow.
			PO verifies station instrument air header pressure > 100 psig.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
E-0 Immediate Operator Actions	SR detector high voltage selector switches in normal.		RO aligns neutron flux monitoring for shutdown.
	NR-45 transferred to operable source and intermediate range displays.		RO verifies all dilution paths are isolated.
	FCV-1CH-113B closed.		
	FCV-1CH-114A closed.		
	FCV-1CH-114B closed.		
	RCS temperature and SG pressure not dropping in an uncontrolled manner.		Crew checks for reactivity Insertion from uncontrolled cooldown.
	Yellow SLI marks lit.		PO verifies steamline isolation.
	SG pressures stable.		Crew determines that no SG's are faulted.
	Five hottest core exit TC's < 1200°F.		RO checks five hottest core exit TC's < 200°F.
	Power below the power range and negative SUR.		RO verifies reactor is subcritical.
	Reactor trip and bypass breakers open, neutron flux decreasing. Rod bottom lights lit. Rod position indication at "0".		US exits FR-S.1 and enters E-0. RO verifies reactor is tripped.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>Acknowledge request to perform 1OM-46.4.G to place H₂ Analyzers in service.</p>	<p>Throttle and governor valves closed, reheat stop and intercept valves closed.</p>		<p>RO sounds standby alarm and announces reactor trip.</p>
	<p>Retest flow control valves and MOVs closed.</p>		<p>PO verifies turbine trip.</p>
	<p>Main generator output breakers open. Exciter circuit breakers open.</p>		<p>PO ensures reheat steam isolation.</p>
	<p>AE and DF busses energized.</p>		<p>US refers to SM to ensure that EPP is evaluated.</p>
	<p>SI actuated.</p>		<p>PO verifies generator trip.</p>
			<p>PO verifies power to AC emergency busses.</p>
			<p>RO verifies SI is actuated.</p>
			<p>US directs performance of ESF checklists as time permits.</p>
	<p>Leak collection exhaust fan running.</p>		<p>US directs PAB operator to perform 1OM-46.4.G.</p>
	<p>Tavg stable or trending to 547°F.</p>		<p>PO verifies leak collection fan running.</p>
	<p>PORV-455C closed but leaking.</p>		<p>RO check RCS Tavg stable at or trending to 547°F.</p>
			<p>RO checks PZR isolated and PRT conditions are normal.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>CRITICAL TASK #3: Crew trips all RCP's when RCS to highest SG D/P criteria is exceeded and prior to transitioning from E-1.</p>	Spray valves at zero demand.		
	Safety valves closed.		
	PRT conditions normal.		
	Power available to MOV's. MOV-1RC-535 closed. All other PORV MOV's open with associated PORV in automatic.		
	RCP's stopped due to CIB.		Crew checks if RCP's should be stopped.
	No SG's faulted.		Crew checks if any SG's are faulted.
	No SG's ruptured.		Crew checks if any SG's are ruptured.
	CNMT pressure not normal.		Crew checks if RCS is intact.
	CNMT sump level not normal.		
	CNMT radiation levels not normal.		US exits E-0 and enters E-1.
Control Room dampers shut. Timers running, Control Room pressurizing.		PO verifies CREBAPS actuated.	
All five Control Room bottled air red lights lit.			
Both emergency ventilation timers running.			

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>When requested as U2 Operator, report 2HCV*MOD201A - D closed and 2HCV*MOD204A, B closed.</p> <p>Trip of RCP's satisfies CT #3.</p> <p>Terminate the scenario any time after the Crew completes CT #3.</p> <p>Collect and review logs after allowing Crew time to complete.</p> <p>Erase any VONDS markings.</p>	<p>Control Room intake and Exhaust dampers closed.</p> <p>RCP's secured.</p>		<p>PO verifies CREBAPS actuated in U2 by requesting U2 CREBAPS status.</p> <p>Crew checks if RCP's should be stopped.</p>

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: 1LOT5 NRC Simulator Examination

SUBDIVISION: Simulator

SCENARIO TITLE/NO. Scenario #5

COMPUTER CODE FOR L.P. N/A

Revision No.	Date
0	7/26/02

Revision No.	Date

INSTRUCTIONAL SETTING: BVPS-1 Simulator

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: Western Technical Services, Inc. 7/26/02

_____ Date

REVIEWED BY: E. Emfield 7/26/02

_____ Date

APPROVED FOR IMPLEMENTATION: _____ Date

Facility:	<u>FENOC BVPS Unit 1</u>	Scenario No.:	5	Op Test No.:	2002-NRC-01
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<u>Objectives:</u>	In accordance with plant procedures:				
<u>Initial Conditions:</u>	97% power. IC-175.				
<u>Turnover:</u>	FW-P-3A OOS. Lower reactor power to remove FW-P-1B from service. Severe weather expected.				
<u>Critical Tasks:</u>	E-0.C, Energize AC Emergency Bus FR-H.1.A, Establish Feedwater Flow				

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (PO) N (US)	Reduce power at normal rate.
2	IOR X061029L	I (RO) I (US)	Inadvertent boration due to a boration integrator failure.
3	EPS03B	C (US)	Loss of the system station service transformer.
4	PRS07	I (RO) I (US)	T _{AVG} input to Pressurizer level controller fails low.
5	FWM014	I (PO) I (US)	SG feedwater flow transmitter fails low causing FWRV to open.
6	CND01 CND03 EPS11B FWM11C EPS04E INH53	M (All) C (PO) C (US) C (PO) C (US)	Condensate pump trips. Condensate header rupture. EDG No. 2 trips 30 seconds after output breaker closes Turbine driven AFW pump trips (can be recovered with operator action). 4160V emergency bus trips. EDG No. 1 fails to automatically start (can be started manually).

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

Scenario Description:

The Crew will lower power in preparation for removing a feed pump from service. After lowering reactor power by 5%, an inadvertent boration due to an integrator failure will result in power continuing to lower. The RO will diagnose the cause of the inadvertent boration and take action to manually terminate boration flow.

After stabilizing reactor power, a loss of the system station service transformer will occur. After the PO has diagnosed the failure, the Unit Supervisor will refer to Technical Specifications and direct steps to satisfy the action statement requirements within 1 hour.

Before implementing the Technical Specification required actions, the auctioneered T_{AVG} signal to the Pressurizer level master controller fails low causing charging flow to reduce and actual Pressurizer level to lower. Depending on Operator action, this may result in a Pressurizer high level, associated alarms and the backup heaters to energize. The RO must take manual control to restore Pressurizer level back to program.

After stabilizing Pressurizer level, a SG feed flow transmitter fails low causing the "A" SG feedwater regulating valve to open. The PO must take manual control of the valve to stabilize SG level.

A condensate pump then trips forcing the crew to manually trip the reactor followed by a rupture of the condensate header piping.

Emergency diesel generator No. 2 trips 30 seconds after its output breaker closes causing a loss of emergency 4KV bus 1DF and disabling motor driven AFW pump "3B". The turbine driven AFW pump also trips resulting in a loss of all feedwater flow to the SG's.

The remaining emergency 4KV bus trips on the transfer to offsite power. Emergency diesel generator No. 1 fails to automatically start; however, it can be manually started to supply power to the bus. The turbine driven AFW pump will be restored by operator action to terminate the loss of heat sink event.

The expected procedure flow path is E-0 → ES-0.1 → FR-H.1 → ES-0.1.

INITIAL CONDITIONS:

- The plant is at 97% power.
- Tavg is 575°F.
- RCS boron concentration is 1055 ppm.
- Control Bank "D" is at 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	24 hours prior	3.7.1.2 Action c

SHIFT TURNOVER INFORMATION

1. Reduce power to remove FW-P-1B from service.
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.
- 5.

SCENARIO SUPPORT MATERIAL REQUIRED

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

BEAVER VALLEY POWER STATION
Training Administrative Manual Procedure

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

Lower reactor power.

Reactor power at 97%.

Following the reactivity plan, the Crew lowers reactor power.

US directs the load decrease to < 80% power.

PO initiates a turbine load decrease.

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

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #2

Inadvertent RCS Boration Due To Integrator Failure

Integrator RIC-1CH-113 fails and boration continues.

After Crew has lowered power approximately 5%, insert:

IOR X061029L (0 0) 0

Tavg decreasing.

RO identifies and reports decreasing Tavg and unexpected control rod motion.

RO reports unexpected boration of RCS.

RO determines boration integrator has failed.

US directs PO to stabilize load. PO reduces turbine load to match T_{avg}/T_{ref} .

RO stops the boration.

Boration halted.

Dilution initiated.

RO initiates a dilution to reestablish desired power level.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #3

Loss of Station Transformer 1B

After Crew stabilizes reactor power, insert:

EPS03B

- A8-13, System Station Service Transformer 1B Differential Protection
- A8-31, System Station Service Transformer 1B Undervoltage

138KV OCB83 tripped.

When Crew requests 1OST-36.7 to perform breaker alignment verification, continue with the next event.

PO responds to alarms and determines that SSST "1B" has been lost.

PO verifies SSST "1B" is isolated.

Crew determines what the actuated protection was using the Sequence of Events Recorder.

Crew requests Local Operator to verify that the transformer cooling pumps and fans are stopped.

US refers to T.S. 3.0.5.

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

At Lead Examiner's direction, insert:

IMF PRS07

Auctioneered Tavg signal to Pressurizer level controller fails low.

Charging pump flow decreases.

- A4-2, Pressurizer Control High Level Deviation

PZR level controller or FCV-CH-122 in manual.

Alarm clears if Pressurizer level controller is placed in manual.

RO notes indications and alarms, informs US.

US directs RO to place PZR level controller or FCV-CH-122 in manual.

RO takes manual control of PZR level controller.

US requests I&C to investigate auctioneered Tavg signal failure.

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Training Administrative Manual Procedure

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

At Lead Examiner's direction, insert:

IMF FWM014

SG "A" feed flow transmitter fails low.

SG feed flow and level rise.

- A7-48, Loop 1 Steam-Feedwater Flow Mismatch
- A7-42, Loop 1 Feedwater Flow Greater Than Steam Flow
- A7-45, SG 1A Level Deviation From Setpoint

PO notes problem with SG level control and informs US.

US refers to ARP's and 1OM-24.4.IF, Attachment 2.

Crew determines feed flow transmitter has failed low.

NOTE: Level deviation is dependent on time of

establishing normal MFRV control to restore SG level.

FCV-1FW-476 modulates open in automatic.

SG level control in manual.

PO takes manual control of SG feedwater control valve.

US directs PO to restore SG level to program value.

US directs I&C to investigate feed flow transmitter failure.

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
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EVENT #6

IA Condensate Pump Trip

IMF CND01

SG levels decrease.

PO acknowledges alarms and informs US.

US directs Crew to trip the reactor.

RO manually trips the reactor.

After 1A condensate pump trips, insert:

Pipe rupture in condensate header results in a loss of suction to main feed pumps and reactor trip.

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

IMF CND03

RO verifies reactor trip.

E-0 Immediate Manual Actions

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

RO sounds standby alarm and announces Unit 1 reactor trip.

US directs SM to evaluate EPP.

Turbine tripped. Throttle valves and governor valves closed.

PO verifies turbine tripped.

Reheat flow control and block Valves closed.

PO ensures reheat steam isolation.

BEAVER VALLEY POWER STATION
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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>Loss of "DF" Bus and "3B" AFW Pump</p> <p>EPS11B</p>	<p>Main generator output breakers open. Exciter circuit breaker open.</p>		<p>PO verifies generator trip.</p>
<p>INH53</p> <p>CRITICAL TASK #1: Crew energizes at least one AC emergency bus before transition out of E-0.</p>	<p>EDG No. 2 trips 30 seconds after output breaker closes.</p>		<p>PO verifies DF bus deenergized following diesel sequencing. Recognizes diesel trip and informs US.</p>
<p>Approximately 2 minutes after the reactor trip, report the condensate pump trip and header rupture to the Control Room.</p>	<p>EDG No. 1 fails to automatically start.</p>		<p>US directs PO to manually start EDG No. 1</p>
<p>Approximately 3 minutes after request, report that the No. 2 EDG local panel is deenergized and request Electrical Maintenance aid in the investigation.</p>	<p>EDG No. 1 started and "AE" bus energized.</p>		<p>PO performs steps to start EDG No. 1.</p>
<p>Approximately 2 minutes after the reactor trip, report the condensate pump trip and header rupture to the Control Room.</p>	<p>No SI annunciator</p>		<p>Crew dispatches an Operator to investigate problem with the No. 2 EDG.</p>
<p>Approximately 3 minutes after request, report that the No. 2 EDG local panel is deenergized and request Electrical Maintenance aid in the investigation.</p>	<p>SI actuation status lights not lit.</p>		<p>RO checks if SI has actuated.</p>
<p>Approximately 3 minutes after request, report that the No. 2 EDG local panel is deenergized and request Electrical Maintenance aid in the investigation.</p>	<p>SI actuation status lights not lit.</p>		<p>Crew determines SI is not required.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>FW-P-2 trips. FWM11C</p>	<p>Loss of all feed to SG's. All SG levels less than 5% narrow range.</p> <p>No SI annunciator</p> <p>SI actuation status lights not lit.</p> <p>RCS temperature > 547°F and rising.</p> <p>Condenser steam dumps open as necessary:</p> <p>Steam dumps in steam pressure mode in manual.</p> <p>Station instrument air header pressure > 100 psig.</p> <p>RCS pressure > SG pressure.</p> <p>RCS hot leg temperature > 320°F.</p>		<p>PO informs US of FW-P-2 trip and loss of all feedwater.</p> <p>US exits E-0 and enters ES-0.1 until red path of FR-H.1 is applicable.</p> <p>US directs STA to monitor CSF status trees.</p> <p>RO checks if SI has actuated.</p> <p>RO checks RCS temperature.</p> <p>PO dumps steam using condenser steam dumps to maintain RCS temperature.</p> <p>PO places steam dump controller in steam pressure mode in manual.</p> <p>PO checks station instrument air header > 100 psig.</p> <p>US exits ES-0.1 and enters FR-H.1 when notified of the red path condition for heat sink.</p> <p>PO checks if secondary heat sink is required.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>FW-P-2 throttle valve trip collar is damaged.</p> <p>When requested to check FW-P-2, report that the pump trip collar is damaged and will not reset. Maintenance assistance is needed immediately.</p>	<p>SG wide range levels all > 13%.</p>		<p>US checks if RCS bleed and feed is not required.</p>
	<p>PZR pressure < 2325 psig.</p>		
	<p>PDWST level > 27.5 feet.</p>		<p>PO checks PDWST level > 27.5 feet.</p>
	<p>SG blowdown isolated.</p>		<p>PO checks SG blowdown isolation status.</p>
	<p>FW-P-3A on clearance, FW-P-3B without power.</p>		<p>Crew tries to establish AFW flow to at least one SG.</p>
	<p>FW-P-2 tripped.</p>		<p>Crew dispatches an Operator to investigate trip of FW-P-2.</p>
	<p>AFW pump suction pressure ~ 10 psig.</p>		<p>PO checks AFW pump suction pressure.</p>
	<p>No AFW flow.</p>		<p>PO verifies total AFW flow < 355 gpm.</p>
	<p>SI not in service.</p>		<p>Crew minimizes RCS heat input.</p>
	<p>RCP's stopped.</p> <p>Pressurizer heaters in P-T-L.</p>		<p>RO stops all RCP's.</p>

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INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
<p>As the Operator requested to startup 1FW-P-4, after 3 minutes report to the Control Room that the pump will not start (breaker keeps tripping).</p>	<p>Condensate header not available due to pipe rupture.</p>		<p>PO checks condensate system in service.</p>
<p>NOTE: Crew will exit FR-H.1 by recovering FW-P-2.</p>			
<p>Report FW-P-2 is available.</p>			
<p>CRITICAL TASK #2: Crew establishes feedwater flow into at least one SG before RCS feed and bleed is required.</p>	<p>FW-P-2 in service.</p>		<p>US directs FW-P-2 placed in service.</p>
<p>Terminate the scenario when the Crew transitions to ES-0.1.</p>	<p>All SG NR levels < 13%.</p>		<p>Crew feeds intact SG's using FW-P-2.</p>
<p>Collect and review logs after allowing Crew time to complete them.</p>	<p>AFW flow > 355 gpm.</p>		<p>PO checks SG levels.</p>
<p>Erase any VOND markings.</p>			<p>PO verifies AFW flow > 355 gpm.</p> <p>US exits FR-H.1 and enters ES-0.1, step in effect.</p>

Facility:	<u>FENOC BVPS Unit 1</u>	Scenario No.:	1	Op Test No.:	2002 NRC 01
Examiners:	_____	Candidates:	_____		CRS
	_____		_____		RO
	_____		_____		PO
Objectives:	In accordance with plant procedures:				
Initial Conditions:	Power 75%. IC-171.				
Turnover:	FW-P-3A OOS. Reduce power to remove FW-P-1B from service. Severe weather expected.				
Critical Tasks:	E-0.F, Establish AFW Flow				
	ECA-3.1.B, Cooldown RCS				

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (US) N (PO)	Power reduction at normal rate.
2	FWM01B	C (PO) C(RO) C (US)	Trip of main feed pump.
3	PRS06A	I (RO) I (US)	Pressurizer controlling level channel fails low.
4	MSS14C	I (PO) I (US)	SG 'B' controlling steam flow transmitter fails low.
5	FWM07B MSS07 MSS12B INH20 INH21	M (All) C (PO) C (US)	SG 'B' feedwater control valve fails shut requiring a Rx Trip. Condenser steam dumps fail to operate. SG 'B' atmospheric dump fails open on Rx Trip. AFW pumps fail to auto start (manual start available).
6	RCS03B	M (All)	SG 'B' tube rupture of 500 gpm (ruptured/faulted).

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