

Final Submittal
BROWNS FERRY
EXAM 2002-301
50-259, 50-260, & 50-296

DECEMBER 13, 16-19, 2002

1. As Given Simulator Scenario Operator Actions ES-D-2

BROWNS FERRY NUCLEAR PLANT
INITIAL LICENSE SCENARIO OUTLINE
02NRC-3

Scenario Objective

Evaluate the operators in using the emergency depressurization contingency procedure based on area high radiation.

Scenario Summary

Initial Conditions:

100% RTP
D diesel generator tagged

Events:

Alternate stator cooling water pumps and notification of 2-SR-3.3.6.1.2(3C) failure
APRM failure
Slow loss of HP feedwater heating on B string
Spurious reactor water cleanup system isolation
Inadvertent RCIC start
RCIC steam leak

Scenario Sequence

The DUO alternates stator cooling water pumps
APRM 2 fails high
A slow (but slowly increasing) leak develops in B2 high pressure heater requiring isolation
The reactor water cleanup system spuriously isolates
RCIC gets an inadvertent initiation signal and is secured
RCIC develops an unisolable steam leak requiring emergency depressurization on high area radiation

Event one - Alternate stator cooling water pumps

The DUO alternates stator cooling water pumps.

Malfunctions required: None

Objective:

Evaluate the DUO in use of normal operating procedures.

Success Path:

Start 2B stator cooling water pump and stop 2A stator cooling water pump

Event two - Failure of APRM 2

The BUO determines APRM 2 has failed and bypasses the APRM.

Malfunctions Required: 1

Objective:

Evaluate the BUO on use of the Alarm Response Procedures in responding to the failed APRM. Evaluate the SRO on use of Technical Specifications.

Success Path:

The BUO manually bypasses APRM 2 and the SRO determines only three APRMs required.

Event three - Slowly increasing leak on B2 high pressure heater

The crew will respond to a rising high pressure heater level in accordance with the ARPs and AOI-6-1A.

Malfunctions Required: 1

Objective:

Evaluate the BUO on use of Abnormal Operating Instructions in responding to a rising high pressure heater level.

Success Path:

Determine which heater has the leak
Dispatch personnel to investigate
Reduce reactor power to <91% when steam valves isolate
Reduce power to <79% when the feedwater isolation valves are closed
Notify reactor engineer

Event four: Spurious reactor water cleanup system isolation

The crew responds to an isolation of the RWCU.

Malfunctions Required: 1

Objective:

Evaluate the BUO and DUO on use of Abnormal Operating Instructions in responding to a loss of the reactor water cleanup system.

Success Path:

Ensure auto actions (isolations) have occurred
Check area temperatures and radiation
Notify chemistry and reactor engineering
Return system to service following determination of cause

Event 5 -

The crew responds to an inadvertent RCIC initiation.

Malfunctions Required: 1

Objective:

Evaluate the DUO and SRO in response to an abnormal occurrence.

Success Path:

Recognize RCIC initiation
Secure RCIC
Initiate and investigation

Event 6 - RCIC steam leak

The crew will respond to an unisolable RCIC system leak and emergency depressurize due to high area radiation in secondary containment.

Malfunctions Required: 1 (2 if HPCI is initiated)

Objective:

Evaluate the crew on their response to a major event - an unisolable leak in the reactor building which leads to emergency depressurizing due to two area radiations above max safe.

Success Path:

Recognize all three reactor feedpumps tripped
Initiate manual scram
Enter EOI-1
Recognize HPCI fails to control in automatic and take manual control
Return to RCIC for level control after HPCI logic power loss
Dispatch personnel to isolate RCIC when leak occurs
Enter EOI-3
Maintain RPV level with 'C' RFP after RCIC loss
Emergency depressurize per C2 when 2 area radiations above max safe
Enter EOI-2
Initiate suppression pool cooling

Scenario Recapitulation

Total Malfunctions	6
Abnormal Events	5
Major Transients	2
EOIs Entered	3
EOI Contingencies	1 (C2)

Facility: Brown Ferry Nuclear Plant Scenario No.: 02NRC-3 Op-Test No.: _____Examiners: _____ Operators: _____

Initial Conditions: 100% RTP, D diesel generator tagged for maintenance

Turnover: Alternate stator cooling water pumps per OI-35A, Section 6.3., 2B Reactor Feedwater pump oscillating and is in Auto to collect data. Storms passing through the area.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N(DUO)	DUO alternates stator cooling water pumps.
2	nm16	I(BUO)	Failure of APRM 2
3	fw05b	R(BUO)	Slowly increasing leak in B2 high pressure heater string (recirc and drive rods)
		C(DUO)	Heater tube rupture
4	sw05	C(BUO) (SRO)	Spurious isolation of the reactor water cleanup system
5	rc02	C(DUO)	Inadvertent RCIC start
6	batch	C(BUO)	Trip of all RFPs
	hp07	C(DUO)	HPCI Flow controller failure
	rc09	M(ALL)	RCIC leak into secondary containment requiring emergency depressurization

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

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: 02NRC-3 Event No.: 1 Page 1 of 1

Event Description: Normal Operations

[illegible]

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: <u>02NRC-3</u> Event No.: <u>2</u> Page <u>1</u> of <u>1</u>		
Event Description: Normal Operations		
Time	Position	Applicant's Actions or Behavior
	B	Acknowledges ROD BLOCK alarm (associated with APRM high)
	B	Acknowledges APRM HIGH alarm per 2-ARP-9-5A, Window 25
		Verifies by multiple indications
		APRM chassis lights on Panel 9-14
		Status lights on Panel 9-5
		Determines APRM 2
	SRO	Grants permission to bypass APRM 2
	B	Bypasses APRM 2 per 2-OI-92B
		Reviews P&Ls
		Places APRM bypass switch in channel 2 (9-5)
		Checks blue bypassed lights illuminated on panel 9-14 voters
		Verifies white bypass light on Panel 9-5 is illuminated
	SRO	Refers to TS 3.3.1.1
		Determines only three required
		No action
	SRO	Directs maintenance for APRM 2

Op-Test No.: _____ Scenario No.: <u>02NRC-3</u> Event No.: <u>3</u> Page <u>1</u> of <u>2</u>		
Event Description: Slow loss of HP feedwater heating on B string		
Time	Position	Applicant's Actions or Behavior
	B	Announces "BYPASS VALVES TO CONDENSER NOT CLOSED" alarm per 2-ARP-9-6A, Window 9
	B	Checks condensate flow recorder 2-29, Panel 2-9-6
	B	Checks heater B2 shell pressure on Panel 2-9-6
	B	Checks 2-FCV-6-95 open
	B	Verifies heater level on ICS screen (FWHL)
	B	When B2 heater indicates high (yellow) dispatches personnel to investigate
	B	Dispatches personnel to manually control heater level
	B	When high-high level (red) is received
	SRO	Directs power reduced to <91%
	B	Reduces reactor power with upper runback
	B	Verifies heater 2B1 and 2B2 extraction isolate
	B	Trips 2B1 and 2B2 moisture separator drain pumps
	B	When level is still rising
	SRO	Directs power reduction to <79%
	B	Reduce power to <79% with mid-power runback
	B	Closes 2-FCV-3-31 and 2-FCV-3-76
	SRO	Directs entry into 2-AOI-6-1A
	B	Adjusts flow and power as directed by the SRO
		Verifies valve positions per Attachment 1 and monitors thrust bearing temperature
	D	Refers to 2-OI-6 for turbine load restrictions
		Determines load restricted to 920 MWe

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: 02NRC-3 Event No.: 3 Page 2 of 2

Event Description: Slow loss of HP feedwater heating on B string (Continued)

[illegible]

Op-Test No.: _____ Scenario No.: <u>02NRC-3</u> Event No.: <u>4</u> Page <u>1</u> of <u>2</u>		
Event Description: Spurious reactor water cleanup system isolation		
Time	Position	Applicant's Actions or Behavior
	Crew	Recognizes RWCU isolation and responds per ARP, 9-4B, Window 17
	B	Reports RWCU non-regenerative hx discharge temperature high alarm
	B	Verifies temperature increase on TI-69-6
	B	Monitors RBCCW suction temp, checks normal
	B	Reports cleanup pump trip
	B	Reports RWCU system isolation
	B	Verifies FCV-69-1,2,12 closed
	D	Dispatches personnel to check TCV-70-49
	SRO	Contacts Reactor Engineer for heat balance check
	D	Notifies chemistry that RWCU system is out of service
	SRO	Enters AOI-64-2A
	D	Checks area temperatures
	D	Checks area radiation monitors for rise
	D	Requests reactor engineering to make heat balance check
	D	Notifies chemistry that RWCU is out of service
	SRO	Directs RWCU returned to service per 2-OI-69 when cause determined
	D	Return RWCU per 2-OI-69
		Dispatch AUO to RWCU control Panel for return to service
		Reset PCIS
		Notify chemistry of return to service
	SRO	Evaluate Tech Specs (TRM TSR 3.4.1) chemistry sampling is required if
		not returned to service

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: 02NRC-3 Event No.: 4 Page 2 of 2

Event Description: Spurious reactor water cleanup system isolation

[illegible]

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: 02NRC-3 Event No.: 5 Page 1 of 1

Event Description: Inadvertent RCIC start.

[illegible]

Op-Test No.: _____ Scenario No.: 02NRC-3 Event No.: 6 Page 1 of 3

Event Description: RCIC Steam Leak

Time	Position	Applicant's Actions or Behavior
	B	Recognizes all 3 reactor feed pumps tripped
	SRO	Directs reactor scram
	B	Manually scrams the reactor
	B	Places mode switch in shutdown
	B	Checks power lowering
	B	Verifies all rods in
	B	Inserts IRMs and SRMs
	SRO	Enters EOI-1 on low reactor water level
	SRO	Directs level controlled by HPCI and CRD Per Appendices 5D and 5B
	SRO	Enters AOI-100-1
	D	Uses HPCI for reactor water level control per Appendix 5D
	D	Recognizes HPCI fails to control in AUTO
	D	Transfers HPCI to manual control
	D	Controls RPV level with HPCI in manual
	B	Raises CRD flow per Appendix 5B
	D	(After water level is controlled at -50" with HPCI) Recognizes HPCI logic
		power failure
		(continued)

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: <u>02NRC-3</u> Event No.: <u>6</u> Page <u>2</u> of <u>3</u>		
Event Description: RCIC Steam Leak		
Time	Position	Applicant's Actions or Behavior
	D	Notifies SRO of HPCI logic power failure
	SRO	Directs RCIC placed in service
	D	Places RCIC in service
	D	Verifies RCIC low controller in auto/600 gpm
	D	Resets and opens 2-FCV-71-9
	D	Verifies open 2-FCV-71-9, RCIC TRIP/THROTTLE VALVE
	D	Opens 2-FCV-71-39, RCIC INJECTION VALVE
	D	Opens 2-FCV-71-34, RCIC MINIMUM FLOW VALVE
	D	Opens 2-FCV-71-25, RCIC LUBE OIL COOLING WATER VALVE
	D	Places 2-HS-71-31A in Start - RCIC VACUUM PUMP
	D	Open 2-FCV-71-8, RCIC Turbine Steam Valve
	D	Adjust RCIC flow controller as required
	D	Recognizes and reports area radiation alarm for RCIC room
	D	Recognizes and reports high area temperature for RCIC room
	D	Recognizes RCIC failure to auto isolate and attempts to manually isolate
	D	Recognizes RCIC failure to manually isolate and informs SRO
	SRO	Enters EOI-3
	SRO	Directs RCIC isolated locally
	SRO	Directs 'C' Reactor Feedpump for level control per Appendix 5A
	B	Controls RPV level with 'C' reactor feedpump per Appendix 5A
	SRO	Directs Appendix 8G or restoration of drywell air
	B	Performs Appendix 8G
		(Continued)

Op-Test No.: _____ Scenario No.: 02NRC-3 Event No.: 6 Page 3 of 3

Event Description: RCIC steam leak

Time	Position	Applicant's Actions or Behavior
	SRO	Determines 2 area radiations above max safe
	SRO	Directs emergency depressurization per C2
	SRO	Determines suppression pool level >5.5 feet
	SRO	Directs BUO to open 6 ADS valves
	D	Opens 6 ADS valves
	D	Determines ADS valves 1-19 and 1-34 failed to open
	D	Opens 2 additional ADS valves
	B	Verifies reactor feedpump discharge valves closed
	SRO	Directs RPV level maintained +2" to +51" with:
		Condensate per Appendix 5A
		RHR per Appendix 6 B/C
		CS per Appendix 6 D/E
	B	Maintains +2" to +51" with condensate per Appendix 5A
	SRO	Enters EOI-2 on suppression pool temperature >95F
	SRO	Directs all available suppression pool cooling per Appendix 17A
		Initiates suppression pool cooling per Appendix 17A
	D	
	SRO	Directs H202 Analyzers placed in service
	B	Places H202 Analyzers in service

BROWNS FERRY NUCLEAR PLANT
INITIAL LICENSE SCENARIO OUTLINE
02NRC-4

Scenario Objective

Evaluate the operators in using the emergency depressurization (C2) and alternate level control (C1) EOI contingency procedures.

Scenario Summary

Initial Conditions: 79% RTP, 2C RHR pump tagged, 2-SR-3.5.1.7, HPCI Flow Rate Test, in progress.

Events:

Place Suppression Pool cooling in service
Power ascension
HPCI steamline breaks during flow rate SR and fails to auto isolate
CRD pump 2A trip with manual start of 1B CRD pump
SRV-1-04 fails open
Recirculation pump vibration, seal leakage and scram
MSIV closure/LOCA

Scenario Sequence

Place Suppression Pool cooling in service
Continue power ascension at prescribed rate
HPCI steamline breaks during SR requiring manual isolation and EOI-3 entry
SRV-1-04 fails open and closes when DUO responds by cycling the valve
2A Recirc pump develops vibration problems to the point of causing seal failure, requiring pump trip and isolation but the suction valve will not close
drywell pressure begins increasing
Power oscillations develop requiring a manual scram due to failure of OPRM channels
The MSIVs fail closed due to a fuse failure in the Group I isolation circuit
The RPV water level drop to below -100" requiring implementation of C1, alternate level control
When water level reaches TAF (-162") the crew emergency depressurizes and reestablishes normal water level with low pressure systems

Event one - Loop II RHR in Suppression Pool cooling

The DUO will place Loop II RHR in Suppression Pool cooling per 2-OI-74.

Malfunctions required: None

Objective:

Evaluate the crew during normal operating evolutions.

Success Path:

2B and 2D RHR pumps in Suppression Pool cooling

Event two - Power ascension

The crew will raise reactor power at the prescribed rate using recirc flow.

Malfunctions required: None

Objective:

Evaluate the crew during normal operating evolutions.

Success Path:

Use peer checker

Raise reactor power at the desired rate

Event three - HPCI steamline break

The crew will respond to a HPCI steamline leak, and failure to auto isolate, in accordance with the Abnormal Operating Instructions and will briefly enter EOI-3.

Malfunctions Required: 2

Objective:

Evaluate the crew in use of Abnormal Operating Instructions during a HPCI steamline break and failure to auto isolate. Evaluate the SRO who will briefly enter EOI-3 and make a technical specification determination.

Success Path:

Recognize HPCI steamline break - alarms, area temps, area radiation

Recognize failure of HPCI to auto isolate and manually isolate

Close FCV-1-55 and FCV-1-56

Determine unit in 72 hours LCO (TS 3.5.1.D-HPCI and C RHR inop)

Determine 1 hour to tag a HPCI steamline isolation valve closed (TS 3.6.1.3)

Event 4 – CRD pump 2A trip

The crew will respond to a trip of 2A CRD pump in accordance with 2-AOI-85-3.

Malfunctions required: 1

Objective:

Evaluate crew response to an abnormal event (CRD pump trip) using the Abnormal Operating Instructions.

Success Path:

Recognize pump trip

Place flow controller in manual at zero demand

Start 1B CRD pump and open discharge valve to Unit 2

Use manual potentiometer to set CRD flow between 45 –60 GPM and cooling water @P to 20 PSID

Place flow controller in automatic

Event 5 - SRV-1-04 fails open

The crew will respond to an SRV failing open using the Abnormal Operating Instructions. The valve will close when cycled.

Malfunctions required: 1

Objective:

Evaluate the crew on Abnormal Operating Instruction usage while responding to an open SRV.

Success Path:

Recognize SRV open
Cycle the valve
Recognize valve close

Event 6 - Recirc vibration, seal leakage, power oscillations and scram

The crew will experience 2A recirc pump vibration which leads to seal failure, pump trip and power oscillations requiring a manual scram.

Malfunctions required: 4

Objective:

Evaluate the crew response to an abnormal event (recirc pump vibration, leakage, trip) using the abnormal operating instructions and recognizing power oscillations requiring a scram.

Success Path:

Recognize pump vibration and dispatch personnel
Change pump speed
Recognize seal failure
Trip and isolate recirc pump
Recognize failure of suction valve to isolate and dispatch personnel to investigate
Recognize power oscillations
Manually scram

Event 7 - MSIV closure/LOCA

When the crew inserts a manual scram the MSIVs close due a fuse failure leaving them with RCIC, CRD and SLC for high pressure level control with an increasing recirc pump piping leak. They will ultimately be required to depressurize due to being unable to maintain RPV level above TAF.

Malfunctions Required: 2

Objective:

Evaluate the crew in recognizing a condition requiring a manual scram (power oscillation) and implementation of the EOIs including contingencies C1 (alternate level control) and C2 (emergency depressurization).

Success Path:

Recognize MSIV closure
Control pressure 800-1000 psig with alternate means (SRVs, RCIC)
Attempt to maintain RPV level +2" to +51"
Enter EOI-1 and 2
Initiate suppression pool cooling
Spray the suppression chamber
Initiate a cooldown
Spray the drywell
trip 2B recirc pump

stop drywell blowers
Report CRD pumps tripped
Send personnel to perform Appendix 7B, RPV Makeup from the SLC Test Tank
At RPV level -100" to -122" enter C1
Inhibit ADS
Stop spraying containment
Emergency depressurize when RPV level reaches TAF
Restore RPV level to +2" to +51" with low pressure systems

Scenario Recapitulation

Total Malfunctions:	10
Abnormal Events:	3
Major Transients:	2
EOIs Entered	3
EOI Contingencies	2

Appendix D Scenario Outline *Final Form ES-D-1 (R8, S1)*

Facility: <u>Brown Ferry Nuclear Plant</u> Scenario No.: <u>02NRC-4</u> Op-Test No.: _____			
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: 79% RTP 2C RHR pump tagged HPCI flow rate SR in progress			
Turnover: Loop II RHR vented and ready to put in suppression pool cooling per 2-OI-74 Increase reactor power to RTP Continue SR-3.5.1.7, HPCI Flow Rate Test, at Step 7.11 FCV-73-36 seal-in circuit has been disabled for HPCI SR			
Event No.	Malf. No.	Event Type*	Event Description
1	None	N(DUO)	Place Loop II RHR in Suppression Pool cooling
2	None	R(BUO) N(ALL)	Power ascension
3	hp08 hp09	C(DUO) (SRO)	HPCI steamline break and failure to auto isolate
4	rd01a	C(BUO)	CRD pump 2A trips
5	ad01c	C(DUO) (SRO)	SRV-1-04 fails open and closes when cycled
6	th12a th11a th10a override	M(ALL) C(BUO)	Recirc pump vibration, total seal failure. Failure of Recirc suction valve to close
7	rp11 th33b rd01a rd01b	M(ALL) C(BUO)	MSIV closure, main steamline leak in drywell 1B CRD pump trips

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
Final Form ES-D-2 (R8, S1)

Operator Actions

Event Description: Place Loop II RHR in Suppression Pool cooling

[illegible]

Page 1 of 1[illegible]

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 3Page 1 of 2

Event Description: HPCI steam line break

Time	Position	Applicant's Actions or Behavior
	SRO	Directs DUO to continue with 2-SR-3.5.1.7 at Step 7.11
	DUO	Starts SGT C per 2-OI-65
		Starts HPCI Steam Packing Exhauster
		Opens 2-FCV-73-36
		Throttles open 2-FCV-73-35 (~ 7 seconds)
		Announce HPCI turbine start over plant PA system
		Place Aux Oil pump HS to start
		Opens 2-FCV-73-30
		Opens 2-FCV-73-16
		Throttles 2-FCV-73-35 & 36 to establish rated flow at ~ 1150 psig
		Announces Reactor Bldg Hi Rad alarm
		Evacuates HPCI area
	SRO	Enters EOI-3 on HPCI area high radiation and high temperature
	DUO	Determines HPCI area source of high radiation
		Responds to HPCI leak detection temperature alarm IAW the ARP
		Recognizes HPCI not isolated when required (yellow isolation lights)
	SRO	Directs HPCI manually isolated
	DUO	Closes 2-FCV-73-2 & 3
		Notifies Rad Con
		Monitors lowering HPCI area temperatures and radiation levels

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 3Page 2 of 2

Event Description: HPCI steam line break

Time	Position	Applicant's Actions or Behavior
	SRO	Directs entry into AOI-64-2B
		Directs FCV-1-55 and 56 open
		Dispatches personnel to investigate the HPCI leak
	DUO	Opens FCV-1-55 and 56 (9-3)
	SRO	Determines Unit in 72 hours LCO (TS 3.5.1.D - HPCI and C RHR inop)
		Determines 1 hour to isolate and tag either FCV-73-2 or 3 (TS 3.6.1.3)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 4 Page 1 of 1

Event Description: CRD pump 2A trip

Time	Position	Applicant's Actions or Behavior
	BUO	Recognizes and reports trip of 2A CRD pump
	SRO	Directs immediate actions of 2-AOI-85-3
	BUO	Place 2-FIC-85-11 in manual at minimum setting
		Starts CRD pump 1B
		Opens 2-FCV-85-8
		Adjusts CRD system flow to between 40-65 gpm
		Verifies CRD cooling water @P at ~ 20 psid
		Balances Flow Controller 2-FIC-85-11 and places in automatic
	SRO	Calls for maintenance/outside US to check 2A CRD pump

Page 1 of 1[illegible]

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: <u>6</u> Page <u>1</u> of <u>2</u>		
Event Description: Recirc vibration, seal leakage, power oscillations and scram		
Time	Position	Applicant's Actions or Behavior
	BUO/DUO	Announces Recirc 2A vibration alarm and consults ARP (9-4A-)
		Dispatches AUO to local panel to check vibration
		Monitors Recirc pump temperatures
	SRO	Contact Reactor Engineer
		Directs BUO to reduce speed of 2A R ecirc pump to reduce vibration
	BUO/DUO	BUO reduces Recirc A speed and DUO serves as peer checker
		Announces Recirc A seal leakage alarm
		Identifies seal leakage via instrumentation
		Recognizes lowering pressure on R ecirc pump A #1 seal
	SRO	Directs crew to watch for signs of increased leakage
	BUO/DUO	Recognizes Recirc pump A seal leakoff high alarm and informs SRO
		Recognizes lowering pressure on Recirc pump A outboard seal and
		informs SRO
	SRO	When vibration report received or dual seal failure is reported, directs
		A R ecirc pump tripped and isolated
		Directs actions IAW AOI-68-1
	BUO/DUO	Trips Recirc pump A and closes the discharge valve
		Dispatches AUO to Recirc MG set to control temperatures
		Determines Recirc A suction valve will not close and informs SRO
		Directs AUO to attempt to close R ecirc A suction valve from electrical
		board
		(Continued)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 6 Page 2 of 2

Event Description: Recirc vibration, seal leakage, power oscillations and scram (Continued)

Time	Position	Applicant's Actions or Behavior
	BUO	Check power/flow map to verify in region 1
		Checks APRMs and LPRMs for indication of power oscillations
		Informs SRO of power oscillation indications
	SRO	Directs inserting emergency shove sheet control rods
	BUO	Inserts rods as directed by shove sheet
		Monitors power oscillations, reports failure of OPRM scram
	DUO	Keeps SRO informed of rising drywell pressure
	SRO	Directs venting IAW AOI-64-1
	DUO	Vents IAW AOI-64-1
		Notifies log person to monitor release rates
	SRO	Directs manual scram prior to 2.45 psig drywell pressure or on failure of
		OPRM's to scram at setpoint
	BUO	Inserts a manual scram
		Reports all rods in
	SRO	Directs entry into AOI-100-1
		Enters EOI-1 and EOI-2
		Directs venting IAW Appendix 12

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: <u>7</u> Page <u>1</u> of <u>4</u>		
Event Description: MSIV closure/LOCA		
Time	Position	Applicant's Actions or Behavior
	SRO	Directs RPV pressure controlled 800-1000 psig with one or more of:
		MSRVs (Appendix 11A)
		RCIC (Appendix 11B)
		Directs RPV level maintained +2 " to +51" with one or more of:
		RCIC
		CRD
	DUO	Controls RPV pressure 800 to 100 psig with:
		MSRVs (Appendix 11A)
		RCIC (Appendix 11B)
	SRO	Directs determining cause of MSIV isolation (Group 1)
		Directs Appendix 8G, CAD crosstie to DW control air
		Enters EOI-2 and directs:
		Appendix 12, venting primary containment
		Places H2O2 analyzers in service
		Suppression pool cooling placed in service, Appendix 17A
		Verification of all available DW cooling in service
	BUO	Performs Appendix 8G, CAD crosstie to DW control air
		Appendix 12, venting primary containment
		Places H2O2 analyzers in service
		Verifies all available DW cooling in service
		(Continued)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 7Page 2 of 4

Event Description: MSIV closure/LOCA (Continued)

Time	Position	Applicant's Actions or Behavior
	BUO/DUO	Monitors containment parameters
	DUO	Attempts to maintain RPV water level +2" to +51" with one or more of:
		RCIC (Appendix 5C)
		CRD (Appendix 5B)
		SLC (Appendix 7B)
		Places suppression pool cooling in service per Appendix 17A
	SRO	Directs commencing a cooldown
	BUO	Commences a cooldown as directed
	SRO	Determines cannot maintain suppression chamber pressure less than
		12 psig and directs suppression chamber sprays
	DUO	Sprays the suppression chamber IAW Appendix 17C
	SRO	When suppression chamber pressure exceeds 12 psig or SRO
		determines drywell temperature cannot be maintained <280F then
		directs the following:
		Ensure Recirc pumps tripped
		Stop all drywell blowers
		Drywell sprays IAW Appendix 17B
	BUO	Trips Recirc pump B
		Secures drywell blowers
		(Continued)

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 7 Page 3 of 4

Event Description: MSIV closure/LOCA (Continued)

Time	Position	Applicant's Actions or Behavior
	DUO	Sprays DW per Appendix 17B
	SRO	Directs sprays stopped before the affected area reaches 0 psig
	DUO	Stops sprays before either area reaches 0 psig
	SRO	Directs maximum CRD injection IAW Appendix 5B
	BUO	Performs Appendix 5B
		Reports 1B CRD pump trip
		Monitors containment parameters
	Crew	Monitors RPV water level and determines level still lowering
	SRO	Directs performance of Appendix 7B (SLC)
		Enters C1 at -100" to -122" Reactor water level
		Directs ADS inhibited
	BUO	Closes RFP discharge valves
	DUO	Inhibits ADS (Critical Task)
	SRO	After entering C1 directs:
		Aligning all available injection systems for injection
		Terminating containment sprays
		(Continued)

Appendix D Operator Actions *Final* Form ES-D-2 (R8, S1)

Op-Test No.: _____ Scenario No.: NRC-4 Event No.: 7

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Event Description: MSIV closure/LOCA (Continued)

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