

SCENARIO 02 OVERVIEW

Shift from CCP 1-2 to CCP 1-1 (Event 1). The BOP and RO coordinate the transfer of charging pumps.

The crew is directed to ramp to 100% power (Event 2). The RO will have to dilute to ramp turbine and reactor power to 100%.

S/G 1-3 Feedwater Flow channel FT-530 which was inadvertently left "selected" subsequently fails to zero (Event 3). RO sees Feedwater flow recorder indication on S/G 1-3 at zero but S/G level increasing. RO takes manual control of S/G 1-3 feedwater control and restores feed flow/steam flow and S/G level. Maintenance Services investigates and selects good channel for control. S/G 1-3 level control is returned to auto.

S/G 1-1 PORV controller fails high in auto (Event 4) causing PCV-19 to open. The SFM should direct the BOP to take manual control and close PCV-19. The SFM should notify Maintenance Services to investigate failure.

Seismic event causes loss of offsite power (Event 5). A 30 sec long seismic event starts and 230 KV startup power is lost immediately. D/G 1-1 and D/G 1-2 start. After 20 sec of shaking, the 500KV breakers open and then a reactor seismic trip occurs. The plant is now without offsite power and 4KV bus G is dead.

After 20 seconds shaking, 4kv bus F differential lockout occurs (Event 6) and now 4KV bus F is dead.

After 30 seconds of shaking, AFW Pp 1-2 breaker 52-HH-8 trips on overcurrent which causes D/G 1-1 to trip on overcurrent (Event 7). With 4KV bus H dead, the plant has lost all AC power.

The same seismic event causes PZR PORV PCV-456 to fail partially open (Event 8) when it opens on high PZR pressure. When power is restored, the open PORV requires transition to EOP ECA-0.2, Loss of All AC Power, Recovery With SI Required.

About 35 seconds into the seismic event, the Turbine Driven AFW Pump trip-throttle valve trips (Event 9). The plant has now lost all auxiliary feedwater flow. The SFM directs reset of TDAFWP and flow is re-established to the S/Gs.

The scenario should be terminated when power is restored to two vital 4KV buses and the transition to ECA-0.2, Loss of All AC Power, Recovery With SI Required.

Facility:	DCPP Units 1 & 2	Scenario No.:	2	Op-Test No.:	1
Examiners:	Operators:				
Objective:	Evaluate the crew's ability to dilute and operate DEHC system to commence a ramp.				
	Evaluate the crew's ability to diagnose and respond to a S/G feed flow channel failure.				
	Evaluate the crew's ability to diagnose and respond to a S/G PORV controller failure.				
	Evaluate the crew's ability to diagnose and respond to a seismic event.				
	Evaluate the crew in using EOPs during a loss of all AC power.				
	Evaluate the crew in using EOPs during a loss of all feedwater with a stuck open PZR PORV.				
	Evaluate the crew's ability to diagnose and respond to a tripped TDAFP.				
Initial Conditions:	75% power, equilibrium xenon, Middle of cycle (IC-26)				
Turnover:	D/G 1-2 is OOS for Maintenance.				
	Small leakage thru PORV PCV-456 – monitoring per OP O-24.				

Time min	Event No.	Malfunction No.	Event Type*	Event Description
var	1		N, BOP	Shift from CCP 1-2 to CCP 1-1.
var	2		R, All	Raise reactor power.
2	3	loa mfw32 xmt mfw73	I, All	Selected S/G 1-3 feedwater flow channel failure.
12	4	cnh mss2	I, BOP	S/G 1-1 PORV controller failure.
22	5	mal sei1 mal syd1	M, All	Seismic Event – Loss of Offsite power.
cond on	6	mal eps4c	C, BOP	4160v Bus F lockout.

seismic				
cond on seismic	7	pmp afw1 mal eps4e	C, SFM, BOP	Aux feedwater 52-HH-8 pump failure – causes loss of D/G 1-1.
cond on seismic	8	vlv pzm5	C, All	Pressurizer PORV PCV-456 failure partially open.
cond on seismic	9	mal afw1	C, BOP	TDAFP Auto Start failure – (Given back after reset of trip linkage).

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

Op-Test No.: __1__ Scenario No.: __2__ Event No.: __1__ Page
 __1__ of __11__

Event Description: _____ Shift from CCP 1-2 to CCP 1-1

Time	Position	Applicant's Actions or Behavior
	BOP	Coordinate with RO and start CCP 1-1 <ul style="list-style-type: none"> • Monitor CCP 1-1 parameters
		Coordinate with RO and shut down CCP 1-2
		Verify charging and letdown parameters normal on VB2
	RO	Coordinates swap of CCPs with BOP
		Monitors charging parameters during swap of CCPs <ul style="list-style-type: none"> • Charging flow • RCPs seal flows
	SFM	Supervises swap of CCPs

p-Test No.: 1 ____ Scenario No.: 2 ____ Event No.: 2 ____ Page 2 of 11 ____
 Event Description : Commence reactor power increase to 100% power ____

Time	Position	Applicant's Actions or Behavior
	BOP	Monitor plant parameters
	RO	Initiate dilution for ramp to 100% power <ul style="list-style-type: none"> Set up makeup control system for dilution in batch mode (100 - 200 gals.)
		Set up DEHC <ul style="list-style-type: none"> Place MW feedback in service Set load reference Set load rate Raise VPL (Valve Position Limit)
		Commence ramp to 100% power
	SFM	Review precautions and limitations of OP L-4 and conduct tailboard briefing
		Direct RO to commence a ramp to 100% power at 3 - 5 MW/min

NRC SCENARIO 02 SETUP

--	--	--

SIMULATOR SET-UP

<u>CONSOLE ENTRY</u>	<u>DESCRIPTION</u>
<u>INIT 26</u>	<u>Initialize the simulator at 75% power, equilibrium xenon, MOL</u>
<u>DRILL 6020</u>	<ul style="list-style-type: none">• <u>Clears D/G 1-2</u>• <u>Small leakage through PCV-456</u>
<u>Control Boards</u>	<ul style="list-style-type: none">• <u>Place D/G 1-2 mode select switch in MAN</u>• <u>Place CAUTION stickers on D/G 1-2 start/stop switch and breaker</u>

NRC SCENARIO 02 SETUP

CONTROL BOARD SETUP

☐ Copies of all commonly used forms and procedures

☐ Any tags placed/removed as necessary

☐ Plant Abnormal Status Board updated as necessary

☐ Circuit Breaker Flags taken to correct position

☐ Equipment status lamicoids placed correctly

BA Pp 1-2

B.A. XFER PP SUPPLYING BLENDER

CWP 1-1

SUPPLYING IN-SERVICE SCW HX

CWP 1-1

**AUTO RECLOSE FEATURE CUTIN ON THIS
CWP**

CR Vent Trn 1

SELECTED TO BUS 2F

Bus F

CR Vent Trn 1

SELECTED TO BUS 1H

Bus H

☐ Proper Delta-I curve for Simulator INIT on CC1

☐ Rod Step Counters indicate correct position

☐ PPC Setup:

- CC2: QP TAVG, ALM/MODE-1, QP CHARGING.
- Others: BIG U1169, MODE-1.
- RBU is updated.
- DELTAI is updated.
- PENS running.
- R2B blowdown flows at 80 gpm.

☐ SPDS (screens and time updating), A screen "RM", B screen "SPDS".

☐ Chart Recorders in operation

☐ Ensure Annunciator Horn is on (BELL ON) and Sound Effects are on (SOUND ON)

☐ ALL typewriters ON with adequate paper/ribbons/etc. and are in the "ON LINE" status

☐ Video and audio recording systems disabled.

☐ Communications systems turned on and functional

☐ CREDIT/TEAM setup complete, if applicable

☐ Print out copy of RISK ASSESSMENT

NRC SCENARIO 02 SETUP

TIMELINE AND INSTRUCTOR ACTIONS FOR SIMULATION

X = manual entry required

INITIATES:

	<u>TIME LINE</u>	<u>CONSOLE ENTRY</u>	<u>SYMPTOMS/CUES/DESCRIPTION</u>
	<u>var - E1</u>	<u>n/a</u>	<u>Shift from CCP 1-2 to CCP 1-1.</u>
	<u>var - E2</u>	<u>n/a</u>	<u>Raise reactor power to 100%.</u>
X	<u>0 min</u>	<u>DRILL 6021</u>	<u>After normal operations have been sufficiently observed, load session MALS, OVRs, etc. by FILE or MANUALLY (below)</u>
	<u>2 min - E3</u>	<u>loa mfw32 act,1,0,0,d,0</u> <u>xmt mfw733,0,300,120,d,0</u>	<u>Selected S/G 1-1FW flow channel, FT-530, fails low.</u>
X	<u>When asked</u>	<u>to investigate Digital Feedwater Control Console</u>	<u>Investigation finds S/G flow channel 530 was selected for control vice normal.</u>
X	<u>When asked</u>	<u>loa mfw32 act,2</u>	<u>Selects S/G flow channel 531 for control.</u>
	<u>12 min - E4</u>	<u>cnh mss2 6,1,0,720,d,0</u>	<u>S/G 1-1 PORV controller failure.</u>
	<u>22 min - E5</u>	<u>mal sei1 act 0.35,30,1320,d,0</u> <u>mal syd1 act 2,20,0,c,jmlsei1,60</u>	<u>Seismic event - Loss of Offsite Power.</u>
	<u>Cond on - E6 seismic</u>	<u>mal eps4c act 2,0,20,c,jmlsei1,0</u>	<u>Differential lockout on 4kv bus F.</u>
	<u>Cond on - E7 seismic</u>	<u>pmp afw1 4,0,0,30,c,jmlsei1,0</u> <u>mal eps4e act 1,0,0,c,xv3o221b,10</u>	<u>AFW Pp 1-2 failure causes D/G 1-1 failure which results in loss of 4kv bus H.</u>
X	<u>When asked</u>	<u>about status of offsite power system.</u>	<u>500KV system is NOT available due to Earthquake. Checking on 230KV.</u>
	<u>Cond on - E8 seismic</u>	<u>vlv pzs5 2,0,3,2,20,c,jmlsei1,0</u>	<u>PZR PORV, PCV-456, failure partially open.</u>
	<u>Cond on - E9 seismic</u>	<u>mal afw1 act 0,0,35,c,jmlsei1,5</u>	<u>TDAFP Auto Start failure - (Given back after reset of trip linkage)</u>
X	<u>When asked</u>	<u>loa afw1 act,0</u> <u>loa afw2 act,1,20</u>	<u>To reset FCV-152, TDAFP trip linkage.</u>
X	<u>When asked</u>	<u>DRILL 21</u>	<u>To strip 4KV bus G</u>
X	<u>When asked</u>	<u>DRILL 22</u>	<u>To strip 4KV bus H</u>
X	<u>When asked</u>	<u>DRILL 24</u>	<u>To close 8100, 8369A-D, and FCV-357</u>
X	<u>When told by examiner</u>	<u>loa syd1 act,1</u>	<u>To restore Startup power.</u>

NRC SCENARIO 02

CREW TURNOVER SHEET

1. Unit 1 is at 75% power middle of cycle and has been there for the last 4 days.
2. Current reactivity management conditions are:
Diluting RCS approximately 25 gal. every 2 hours.
3. RCS Boron concentration is 1005 ppm.
4. Unit 2 is at 100% and has been there for the last 165 days
5. D/G 1-2 was cleared 12 hrs ago for lube oil heater replacement. RTS expected in 6 hrs.
6. STP I-1C completed for D/G 1-2, due again in 4 hours.
7. Small leakage through PORV PCV-456, approximately 0.01gpm.
8. Following turnover need to swap from CCP 1-2 to CCP 1-1 to equalize operating hours.
9. After CCPs are swapped, need to ramp to 100% power.
10. No one is in containment, no entries are expected.

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

Op-Test No.: __1__

Scenario No.: __2__

Event No.: __3__

Page __3__ of __11__

Event Description : _____ Selected S/G 1-3 Feedwater Flow channel, FT-530, fails low _____

T i m e	Pos itio n	Applicant's Actions or Behavior
	BO P	Recognize and report Feedwater flow channel failure, FT-530 <ul style="list-style-type: none"> Alarm PK09-15, Digital Feedwater Control System Trouble Alarm PK09-03, S/G 1-3 Press, Level, Flow FI-530A failed to zero.
		Monitor and report S/G 1-3 level trends
	RO	Take manual control of S/G 1-3 feedwater control valve <ul style="list-style-type: none"> Use good feedwater flow indication, FI-531, to match feedwater flow to steam flow Restore S/G 1-3 level to normal ** Critical Task
		Places ramp on hold

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

		After good channel, FT-531, selected for control, place S/G 1-3 level control in auto

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

-Test No.: 1 ____ Scenario No.: ____ 2 ____ Event No.: ____ 3 ____ Page ____ 4 ____ of ____ 11 ____

Event Description : ____ Selected S/G 1-3 Feedwater Flow channel, FT-530, fails low_(continued) ____

Time	Position	Applicant's Actions or Behavior
	SFM	Direct RO to take manual control of S/G 1-3 FRV and restore level to normal ** Critical Task
		Direct RO to place ramp on hold
		Go to AR PK09-15, Digital Feedwater Control System Trouble <ul style="list-style-type: none"> Check control room status: alarms, channel failures Direct Operator/Maintenance Service to check DFWCS panel for alarm conditions
		Direct Maintenance Services to select good channel, FT-531, for control
		Direct RO to return S/G 1-3 Feedwater control to auto

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

Test No.: 1 Scenario No.: 2 Event No.: 4 Page 5 of 11
Event Description: S/G 1-1 PORV controller failure

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report unwarranted opening of PCV-19
		Take manual control of controller and close PCV-19
	RO	Recognize and report unwarranted increased steam flow
		Monitor primary and secondary parameters at Control Consoles
	SFM	Acknowledge reports from BOP / RO
		Direct BOP to take manual control of PCV-19 and close it
		Contact Maintenance Services to investigate and repair
		Consult Tech Spec 3.1.7.6

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

t No.:__1__ Scenario No.: __2__ Event No.: __5__ Page __6__ of __11__
 Event Description: _____ Seismic Event - Loss of Offsite
 Power_____

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report Seismic event and loss of Startup power
		Verify D/Gs 1-1 and 1-3 running normally
		Recognize and report Reactor trip
		Recognize and report 4KV bus G de-energized
	RO	Recognize and report Seismic event and loss of Startup power
		Recognize and report Reactor trip
		Recognize and report loss of all offsite power
	SFM	Acknowledge loss of Startup power
		Acknowledge reactor trip <ul style="list-style-type: none"> • Direct immediate actions of E-0

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

		Directs call to switchyard for status of offsite power

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

Scenario No.: 2 Event No.: 6 Page 7 of 11
Event Description: 4160 v Bus F Lockout

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report loss of 4KV bus F <ul style="list-style-type: none">Differential lockout prevents D/G 1-3 from energizing bus
		Shut down D/G 1-3 if directed by SFM
	RO	Recognize and report loss of 4KV bus F
	SFM	Acknowledge loss of 4KV bus F <ul style="list-style-type: none">Implement ECA-0.0 due to loss of two vital 4KV buses
		Possibly direct BOP to shut down D/G 1-3

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

Event No.: __1__ Scenario No.: __2__ Event No.: __7__ Page __8__ of __11__

Event Description: _____ Aux feedwater 52-HH-8 pump failure - causes loss of D/G 1-1

_____ (Loss of all AC event)

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report <ul style="list-style-type: none"> • AFW Pp 1-2 breaker trip on overcurrent • D/G 1-1 trip on overcurrent • loss of 4KV bus H • loss of all AC power
		Perform steps of ECA-0.0 as directed by SFM
	RO	Recognize and report loss of all AC power
		Perform steps of ECA-0.0 as directed by SFM

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

t No.:__1__ Scenario No.: __2__ Event No.: __7__ Page __9__ of __11__
 nt Description: _____ Aux feedwater 52-HH-8 pump failure - causes loss of D/G 1-1 (continued)

 _____ (Loss of all AC event)

Time	Position	Applicant's Actions or Behavior
	SFM	Acknowledge loss of all AC power <ul style="list-style-type: none"> Go to EOP ECA-0.0 ** Critical Task
		Direct immediate actions of EOP ECA-0.0 <ul style="list-style-type: none"> Verify reactor tripped Verify turbine tripped
		Check RCS is isolated <ul style="list-style-type: none"> Direct PZR PORVs to be closed Direct Letdown isolation Direct Excess Letdown isolation
		Direct actions to restore AFW flow ** Critical task

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

		Direct actions to restore power to any vital 4KV bus
		Direct actions to isolate safeguard loads from de-energized vital buses
		Implement ECA-0.3 to restore power to 4KV vital buses

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Page 10 of 11

Event Description: PZR PORV PCV-456 failure partially open

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report PCV-456 open
		Go to close on PCV-456
		Report PCV-456 stuck partially open and unable to isolate
		Perform recovery actions as directed by SFM
	RO	Recognize and report PCV-456 open
		Perform recovery actions as directed by SFM
	SFM	Direct actions to close and isolate PCV-456
		When power is restored, transition from EOP ECA-0.0 to ECA-0.2, Loss of All AC Power Recovery With SI Required
	NOTE:	The scenario should be terminated when power is restored to two vital buses and the transition to ECA-0.2 is made.

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

STUDENT COPY

NRC SCENARIO 02

CREW TURNOVER SHEET

Op-Test No.: 1 Scenario No.: 0 Event No.: 9 Page 11 of 11

Event Description: TDAFP Auto start failure

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report trip of TDAFP ** Critical Task
		Recognize and report loss of all feedwater
		Verify AFW flow to S/Gs when TDAFP is reset
	RO	Perform actions as directed by SFM
	SFM	Acknowledge reports of loss of all feedwater
		Direct actions to establish auxiliary feedwater flow <ul style="list-style-type: none"> Direct actions to manually or locally open aux feedwater valves Direct actions to locally reset FCV-152, TD AFW Pp Trip Throttle Valve and restart pump

STUDENT COPY

NRC SCENARIO 02
CREW TURNOVER SHEET

STUDENT COPY