

Facility: DCPP Units 1 & 2 Scenario No.: 1 Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
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Objectives: Evaluate the crew's ability to swap condensate booster pump sets  
Evaluate the crew's ability to diagnose and respond to a VCT level control channel failure  
Evaluate the crew's ability to diagnose and respond to a MFW pump controller problem  
Evaluate the crew's ability to diagnose and respond to a Turbine Control failure in Auto  
Evaluate the crew in using EOPs during an ATWS  
Evaluate the crew in using the EOPs during a loss of 230kV event  
Evaluate the crew's ability to diagnose and respond to a loss of TDAFW and MDAFW  
pumps  
Evaluate the crew in using EOPs during an FRH condition

Initial Conditions: 100% power, equilibrium Xe, 1150 ppm, BOL (IC-1) MDAFW pump 1-2 OOS last 12  
hours for bearing inspection, back in service in 8 hours. PRA OK.

Turnover: Start Standby Condensate Booster Pump set, place set 1-1 in standby.  
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Time min	Event No.	Malf. No.	Event Type*	Event Description
3	1		N, BOP	Swap Condensate Booster Pump sets
10	2		N,R, ALL	Commence power reduction to 70% (NO report Htr 2 DP oil leak)
20	3	mal tur4, 3	C, BOP	Turbine control failure requiring manual ramp
30	4	Xmt cvc19	I, RO	VCT Level channel 112 fail high
40	5	Ovr cc3049e Ovr cc3049h	C, ALL	MFW Pump master controller failure requiring manual control
On MFWP trip	6	mal ppl5	I, ALL	ATWS
Cond on 13D/E open	7	mal syd2	C, ALL	Loss of 230kV
Cond on 13D/E open	8	pmp afw2 mal afw1	M, ALL	Loss of All Feedwater (MDAFW and TDAFW Pump failure)

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

The Crew will swap condensate booster pump sets, referencing OP C7A:I

The Turbine Building NO will report an oil leak on Heater 2 Drip Pump, requiring a power reduction to 70% in preparation for tripping the pump. OP L-4 will be used for the power reduction, providing guidance on boration and setup of the turbine controls. A boration will commence and a controlled power reduction follows.

The Turbine controls will then shift to manual following a fault in the auto circuitry. This produces no alarms, but indications on the turbine control panel will indicate the change as well as the changes in plant parameters when the power reduction stops with boron injection underway. The crew will have to choose between stopping the ramp, or ramping manually to prepare for tripping the Heater 2 Drip Pump.

VCT Level channel 112 fails, giving a high VCT level alarm and diverting letdown to the hold up tanks. The crew should recognize the channel failure and respond per AP-19. Letdown should be restored to the VCT. The ramp may be stopped, but should be recommenced after the crew determines the failure does not impact the ramp.

The Master Feedwater Pump controller fails, requiring the crew to take manual control of both Main feedwater Pumps. The operator may not be able to analyze the problem and take corrective actions quick enough, which will then result in a Reactor Trip signal from low SG levels. If the operator does react and take control of the pumps manually, the crew will be forced to make a decision on continuing a manual ramp with manual feedwater, or trip the unit.

The unit will not trip on an auto trip signal or a manual trip initiation. The crew will be forced to use the RNO of E-0 and open breakers 13D and 13E. This will cause the rods to fall into the core. The crew will continue with E-0 actions.

Upon opening 13D/E, a loss of 230kV will occur. Plant response will lead to a Safety Injection during the implementation of E-0.

Upon opening 13D/E, the TDAFW pump and remaining MDAFW pump will trip and not restart. The crew should recognize a RED path on Heat Sink, and following transition from E-0 to E-1, enter FR-H.1. With the loss of 230kV, Condensate Booster pumps and MFW pumps are not available, leaving only Bleed and Feed as the method to cool the core. The scenario will end when Bleed and Feed is established.

Facility: DCPP Units 1 & 2 Scenario No.: 1 Op-Test No.: 2

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
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Objectives: Evaluate the crew's ability to increase Accumulator Pressure  
Evaluate the crew's ability to reduce power  
Evaluate the crew's ability to diagnose and respond to failure in RMUW system  
Evaluate the crew's ability to diagnose and respond to a PT 505 failure  
Evaluate the crew's ability to diagnose and respond to a failed PZR spray valve controller  
Evaluate the crew in using EOPs during a Steam Space LOCA  
Evaluate the crew's ability to diagnose and respond to of failure of the SI signal

Initial Conditions: 100% power, equilibrium Xe, BOL 1150 ppm, (IC-1). MDAFW pump 1-2 OOS last 12 hours for bearing inspection, back in service in 8 hours. PRA good.

Turnover: Increase Accumulator 1-1 pressure per OP B-3B:I.  
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Time min	Event No.	Malf. No.	Event Type*	Event Description
3	1		N, RO	Increase Accumulator Pressure
10	2		R, All	Commence Power Decrease (EPOS request fast ramp to 850 MW)
On Boration	3	Ovr cc2010c	C, RO	43/MU fail to auto borate, manual boration required
20	4	xmt TUR2	I, BOP	PT 505 failure low
30	5	cnh pzs3	I, ALL	PRZ spray valve controller fails open in Auto
40	6	Mal pzs1	M, ALL	PZR steam space LOCA
On SI	7	ppl3a ppl3b	I, ALL	Failure of SI to actuate (manual alignment necessary)

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

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## Scenario 01 Test 02 Outline

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Following a tailboard, the crew will increase pressure in Accumulator 1-1 to normal using OP B-3B:I.

After the Accumulator pressure increase, a call from EPOS will request a fast ramp to < 850 MW. The crew will tailboard the ramp and reactivity needs. A boration will start and a ramp commenced.

The boration will fail, the Makeup deviation alarm will alarm. 43/MU will not work in borate mode and must be used in the manual mode. The crew will use PK5-11 and AP-19 to determine the problem and use the alternate method to continue the ramp as requested.

After the crew commences manual boration and the ramp is started again, PT-505 will fail low, causing rods to drive in. The RO must recognize an instrument failure and take the rods to manual. Discussion on tripping bistables in 6 hour per ITS 3.3.1-1 should take place.

The PZR spray controller will fail in auto mode next, requiring the RO to take manual control of the spray valves to control pressure. The SFM will use PK5-17 and AP-13 to guide the crews response.

A PZR steam space LOCA takes place over 10 minutes to a final value of 850 gpm. This will require the crew to diagnose the pressure reduction with minimal PZR level change, and to quantify the leak.

After the leak size is sufficient, an SI will be required. The crew should SI before the low pressure setpoint, however an Over Power reactor trip may cause a reactor trip before the crew can respond. The SI signal will fail, requiring a manual SI signal initiation and manually aligning the valves and pumps for injection.

The scenario will terminate after transition to E-1.2 is completed.

Facility: DCPP Units 1 & 2 Scenario No.: 2 Op-Test No.: 1

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
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Objectives: Evaluate the crew's ability to swap CCW heat exchangers  
Evaluate the crew's ability to decrease reactor power  
Evaluate the crew's ability to diagnose and respond to a Tc instrument drift  
Evaluate the crew's ability to diagnose and respond to a loss of non-vital 120 VAC  
Evaluate the crew's ability to diagnose and respond to an LDTV failure  
Evaluate the crew in using EOPs during a Seismic event  
Evaluate the crew's ability to diagnose and respond to a failure of Train A ECCS Equipment  
Evaluate the crew in using EOPs during a Main Feedline Break  
Evaluate the crew in using EOPs during a LBLOCA

Initial Conditions: 100% power, equilibrium Xe, 1150 ppm BOL (IC-1) DEG 1-1 OOS for fuel pump replacement. OOS 12 hours, expected return in 8 hours. PRA OK.

Turnover: Swap CCW Heat Exchangers.

Time min	Event No.	Malf. No.	Event Type*	Event Description
3	1		N, RO	Swap CCW heat exchangers
10	2		N, R, ALL	Power decrease to 80% (EPOS: Fire at Midway)
20	3	Xmt rcs138	I, RO	RCS Tc (TE-441) fail high
30	4	Mal eps2a	C, RO	Loss of non-vital 120 VAC (PY-15)
40	5	Xmt tur22	C, ALL	Turbine Governor Valve failure (FCV-142)
50	6	Mal sei1		Seismic event
Cond on seismic	7	Mal mfw5d	M, ALL	SG 4 MFL Break IC
0	8	Mal ppl3b (3)	C, ALL	Failure of Tr A ECCS
Seismic + 1 min	9	Mal rcs1(1)	M, ALL	RCS Loop 1 25% DBA

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

The crew will tailboard swapping the CCW heat exchanger for run time. This will entail swapping the running ASW train, and aligning the CCW heat exchanger per OP E-5:IV. The crew will start ASW pump 1-2, make alignments, and secure ASW pump 1-1 and make associated valve lineups.

EPOS will call requesting a decrease to 900 MW due to a fire at the Midway station. The crew will tailboard the ramp and reactivity change. A crew will borate and start a ramp per OP L-4.

During the ramp, Loop 4 Tc (TE-441) will fail high, causing rods to step in on a false high Tave. The crew should recognize the failed instrument and place rods in manual. The SFM stop the ramp, and reference OP AP-5 to ensure the plant is stable and for Tech Spec requirements on tripping bistables in 6 hours and deselecting that channel from Tave recording and control. Rods should be placed back to auto.

Before bistables are tripped, PY-15, Non-Vital 120 VAC will fail, causing many unrelated alarms. The crew should let rods control Tave to Tref because MSRs have been lost. The SFM will reference AP-4, and should request PY-15 be placed on backup power, which will restore the bus and clear the most of the alarms associated with the failure. The ramp should be reinstated if stopped.

Following the restoration of PY-15, the Turbine Governor valve, FCV-142, will fail causing a load rejection. The SFM will enter AP-25 and stabilize the plant. The Asset Team will be contacted for repair.

A Seismic event will take place, causing a Main Feed Line Break on SG 1-4 inside containment and a LBLOCA on Loop 1. The MSL Break will mask the LOCA initially. Train A SI will also fail to initiate and will require manual alignment of valves and pumps. The crew will isolate SG 1-4 using E-2, identify the LOCA and transition to E-1 where they will meet conditions to trip the RCPs. The scenario will continue until transition to E-1.3.

Facility: DCPP Units 1 & 2 Scenario No.: 2 Op-Test No.: 2

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
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Objectives: Evaluate the crew's ability to increase reactor power  
Evaluate the crew's ability to diagnose and respond to a PZR level channel failure low  
Evaluate the crew's ability to restore letdown  
Evaluate the crew's ability to respond to a SGTL  
Evaluate the crew's ability to diagnose and respond to an SG pressure channel failure  
Evaluate the crew's ability to diagnose and respond to a vacuum leak  
Evaluate the crew's ability to diagnose and respond to a unit trip  
Evaluate the crew in using EOPs during an Faulted/Ruptured SG  
Evaluate the crew's ability to diagnose and respond to a failure of Phase A

Initial Conditions: 30% power, 235 ppm EOL. (IC-42) MDAFW pump 1-2 OOS last 12 hours for bearing inspection, back in service in 8 hours. PRA good.

Turnover: Increase power per OP L-4 to 100%.

Time min	Event No.	Malf. No.	Event Type*	Event Description
3	1		N, R, ALL	Increase power to 50%
10	2	xmt pzs40	I, RO	PZR level channel failure low
15	3		N, ALL	Restore Letdown
25	4	xmt mss58	C, BOP	SG 1 pressure channel PT- 516 fail hi (manually close PCV – 19)
35	5	Mal rcs4a	C, ALL	SGTL on SG 1-1 (approx. 5 gpm)
45	6	loa cnd1	C, ALL	Vacuum leak / power reduction
50	7	Mal sei1		Seismic Event (below Rx Trip Setpoint)
Cond on Seismic	8	Mal gen1	C, ALL	Main Generator lockout / unit trip
Cond on Seismic	9	Mal mss6a	M, ALL	SG 1-1 MSL fault
Manually Seismic + 5 min	10	Mal rcs4a	M, ALL	SGTR 1-1 (increase SGTL to 1215 gpm over 5 minutes)
0	11	Mal ppl1b	I, RO	Failure of Train B Phase A

\* (N)ormal

(R)eactivity

(I)nstrument

(C)omponent

(M)ajor



The scenario starts at 30% during a startup. The crew will tailboard and commence a ramp to 50% per OP L-4 and dilute as necessary.

During the ramp, PZR Level Channel LT-459 will fail low, giving PZR level and Charging mismatch alarms. The RO will take manual control of charging and maintain seal injection and PZR level in band. The SFM will enter AP-5 and direct LT-459 be removed from input to control and determining per ITS 3.3.1 that bistables must be tripped in 6 hours.

Letdown will then be reestablished per OP B-1A:XII, allowing normal charging and letdown functions in automatic to resume.

SG 1-1 Pressure Channel PT-516 will fail high, causing the atmospheric, PCV-19 to open. There will be no alarms, and only the sound of steam and the indication of a PCV open light will indicate the problem. The BOPCO will have to take manual control of PCV-19 and close the valve. The SFM will respond per AP-5 and ITS 3.3.2 and determine bistables must be tripped in 6 hours.

A small SGTL will develop on SG 1-1 of approximately 5 gpm. The SJAE Rad alarm (PK11-06) will alarm. The BOPCO will also notice RM-15 counts increasing on the chart recorded on VB-1. The SFM will enter AP-3 and direct the RO to determine the leak rate. He will also determine ITS 3.4.13.d limits of 150 gpd has been exceeded and must start planning for a shutdown.

As the shutdown is planned, a small vacuum leak is initiated. Condensate DO2 and conductivity alarms (PK12-04/05) will alarm. The crew will notice vacuum slowly decreasing. The SFM will direct the RO to start a load decrease while entering AP-7. The BOPCO will be directing leak diagnostics outside the control room.

A seismic event will cause the turbine to trip on a lockout, but because the reactor is below P-9, the reactor will stay on line. The SFM must determine that this condition is acceptable and direct the crew to verify normal plant response.

A MSL Break occurs (SG 1-1 safety fails open) following the seismic event, causing a cooldown and SI to occur. The SFM will enter E-0 and E-2 and direct the BOPCO to isolate SG 1-1. The BOPCO will also determine that Phase A train B did NOT occur, and utilizing Attachment E, align Phase A manually.

Shortly after the MSL break, a SGTR will develop on SG 1-1. The level increase will be masked from the cooldown and rapid level increases from all AFW pumps running. No rad alarms will occur since these are power dependant on N-16. Once RCS pressure is determined to be too low and SG level response is diagnosed as a SGTR, the SFM will transition to E-3, and direct response from there. He will then transition to ECA-1.3.

The scenario terminates at the transition to ECA-1.3

Facility: DCPP Units 1 & 2 Scenario No.: 3 Op-Test No.: 2

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
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Objectives: Evaluate the crew's ability to diagnose and respond to a loss of Data A on DRPI  
Evaluate the crew's ability to diagnose and respond to a Load Transient Bypass Valve failure  
Evaluate the crew's ability to diagnose and respond to a RCP seal failure  
Evaluate the crew's ability to shutdown the unit  
Evaluate the crew's ability to diagnose and respond to a Loss of RWST  
Evaluate the crew in using EOPs during a SBLOCA  
Evaluate the crew's ability to diagnose and respond to a loss of Charging Pumps  
Evaluate the crew in using EOPs during a loss of emergency coolant recirculation

Initial Conditions: 100% power, equilibrium xenon, EOL (IC-35). DEG 1-1 OOS for fuel pump replacement. OOS 12 hours, expected return in 8 hours. CSP 1-1 OOS 20 hours for scheduled motor work, expected return 20 hours. PRA OK.

Turnover: Maintain Power.

Time min	Event No.	Malf. No.	Event Type*	Event Description
3	1	Mal rod8a	I, RO	Loss of Data A on DRPI
10	2	Mal cnd1	C, ALL	LTB (FCV-230) fail open
Cond LTBV	3		R, ALL	Stabilize Power
20	4	Mal rcp2a	C, RO	RCP Seal 2 failure
25	5		R,N, ALL	Controlled Shutdown
30	6	Mal sei		Seismic event
Cond on sei	7	Mal rcp2a	C, RO	RCP Seal 1 failure
Cond on sei	8	Loa sis1	C, ALL	Loss of RWST
Cond on sei	9	pmp cvc1 pmp cvc2	C, ALL	Loss of CCP 1 and 2
Cond on sei	10	Mal rcs3	M, ALL	SBLOCA

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



A Data A failure on DRPI will occur, alarming PK03-21. The SFM will direct DRPI be selected to B train.

The LTB valve, FCV-230, will fail open increasing reactor power above 100% and alarming PK10-07. The crew will have to shed load to maintain power below 100%. Rods will step and boration will be required. OPdT runback may occur. The SFM will enter AP-25 and direct the control room in stabilizing the plant.

RCP 1-1 #2 Seal will fail, causing seal leakoff to #1 to decrease and #2 to increase. PK05-01 will alarm and the SFM will direct the RO/BOPCO to start investigating, including Aux Board RCDT trends while monitoring temperature trends and RCP vibration. The crew should prepare for an orderly shutdown.

A seismic event will cause an RCP 1 seal 1 leak at 10 gpm requiring a pump trip and closure of the seal leakoff valve, a loss of both CCPs, a SBLOCA of 3000 gpm, and a Loss of RWST. No water will be available for injection. The crew will proceed through E-0, E-1 and transition to ECA-1.1 when Cold Leg Recirculation capability cannot be confirmed. The crew will be challenged to NOT trip the RCPs with no SI pumps available and no subcooling. They will proceed until cooldown is established with dumping steam and a 100°F/hr cooldown rate is established.

**PART B EXAM, TEST 1**

Facility: <u>DCPP</u>		Date of Examination: <u>10/28/2002</u>	
Exam Level (circle one): RO / SRO(I) / SRO(U)		Operating Test No.: <u>1</u>	
<b>B.1 Control Room Systems</b>			
System / JPM Title		Type Code*	Safety Function
<b>TAB 1</b> 004 – CVCS Makeup to RWST – <b>NRCLJC – 9</b>		D,S,L	I
<b>TAB 2</b> 074 – Inadequate Core Cooling Establish Feed from Condensate System – <b>NRCLJC – 12</b>		D,A,S,L	IVA
<b>TAB 3</b> 006 – ECCS Align RHR to Containment Spray – <b>NRCLJC – 3</b>		D,A,S,L	II
<b>TAB 4</b> 062 – AC Distribution Crosstie Vital Bus G to H – <b>NRCLJC – 4</b>		D,S,L	VI
<b>TAB 5</b> 068 – Control Room Evacuation Control Room Actions Prior to Evacuation – <b>NRCLJC – 5</b>		D,S	VIII
<b>TAB 6</b> 008 – CCW Respond to High Ultimate Heat Sink Temp – <b>NRCLJC – 6</b>		D,A,S	VIII
<b>TAB 7</b> 010 – PZR Pressure Control Initiate Auxiliary Spray – <b>NRCLJC – 14</b>		N,A,S,L	III
<b>B.2 Facility Walk-Through</b>			
<b>TAB 8</b> 064 – Emergency Diesel Generators Local Start of a Diesel Generator – <b>NRCLJP – 15</b>		D,A	VI
<b>TAB 9</b> 040 – Steam Line Rupture Locally Close an MSIV – <b>NRCLJP – 16</b>		M,R,L	IVB
<b>TAB 10</b> 061 – Auxiliary Feedwater Align Alternate AFW from Fire Water – <b>NRCLJP – 21</b>		D,R,L	IVB
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

**PART B EXAM, TEST 2**

Facility: <u>DCPP</u>		Date of Examination: <u>10/28/2002</u>	
Exam Level (circle one): RO / SRO(I) / SRO(U)		Operating Test No.: <u>2</u>	
<b>B.1 Control Room Systems</b>			
System / JPM Title		Type Code*	Safety Function
<b>TAB 1</b> 006 – ECCS <span style="color: red;">RO/SROI</span> Perform Actions for Trip with SI – <b>NRCLJC – 8</b>		M,A,S	III
<b>TAB 2</b> 004 – CVCS <span style="color: red;">RO/SROI</span> Establish Emergency Boration – <b>NRCLJC – 1</b>		D,A,S,L	I
<b>TAB 3</b> 022 – Containment Cooling <span style="color: red;">RO/SROI</span> Place CFCU Drain Collection In Service – <b>NRCLJC – 10</b>		N,S	V
<b>TAB 4</b> 002 – RCS <span style="color: red;">RO/SROI/SROU</span> Initiate Bleed and Feed for Loss of Heat Sink – <b>NRCLJC – 22</b>		D,A,S,L	IVA
<b>TAB 5</b> 015 – Nuclear Instrumentation <span style="color: red;">RO/SROI/SROU</span> Remove PR Channel 42 From Service – <b>NRCLJC – 23</b>		D,S	VII
<b>TAB 6</b> 074 – Inadequate Core Cooling <span style="color: red;">RO/SROI/SROU</span> Actions during FR-C.1 – <b>NRCLJC – 13</b>		N,A,S,L	IVA
<b>TAB 7</b> 064 – Emergency Diesel Generators <span style="color: red;">RO/SROI</span> Manual Start DG 12 from Control Room – <b>NRCLJC – 18</b>		D,S	VI
<b>B.2 Facility Walk-Through</b>			
<b>TAB 8</b> 068 – Control Room Evacuation <span style="color: red;">RO/SROI/SROU</span> Align 480V Buses from HSP – <b>NRCLJP – 19</b>		D	VIII
<b>TAB 9</b> 061 – Auxiliary Feedwater <span style="color: red;">RO/SROI</span> Reset TDAFWP – <b>NRCLJP – 20</b>		D,R,L	IVB
<b>TAB 10</b> 068 – Liquid Radwaste <span style="color: red;">RO/SROI/SROU</span> Isolate Ruptured LHUT – <b>NRCLJP – 17</b>		D,R	IX
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			