ILT 15-1 NRC Exam Scenario 1

Appendix	D	Scenario Ou	tline	Form ES-D-1
Facility:	Clinton Power Station	Scenario No.: 1	Operating Test No.	: <u>2017-301</u>
Initial Co • Mo Tes • Thu • CY • CP run Turnove • Prio • S • S	onditions: bde 1 at ~78% power to support sts on the next shift. understorms are expected in th 'Pump 'B' (0CY01PB) is OOS 1 S 9080.03 DG 1C Operability - uning in parallel with RAT 'B'. er: prities for the shift are as follows Secure Division 3 Diesel Genera Quick Start Operability, starting Maintain power at 78% through	t performance of e area within the for maintenance. - Manual and Qu s: ator (DG 1C) per g at step 8.2.16 – out the shift.	CPS 9031.07 Main Turbine Co next hour. Not expected back this shift. ick Start Operability is in progre CPS 9080.03 DG 1C Operabili - First Priority.	ontrol Valve ess. DG 1C is
Event No.	Malf. No.	Event Type*	Event Description	
1	N/A	N-BOP	Secure DG 1C	
2	YP_XMFTB_3986 A05_A02_A104_3_TVM A05_A02_A105_3_TVM A05_A02_A106_3_TVM	TS-SRO	DG 1C Overspeeds When Ur	lloaded
3	A02_A05_01_7_TVM=2	C-ATC	CRD high temperature	
4	CAM0PR001IA_PUMP to 1 CAM0PR001TV_VALUE15 to 0	C-BOP TS-SRO	Failure of 0RIX-PR001 Ch 15 to sample pump failure	- Low flow due
5	A01_A02_01_8_TVM	C-ATC	Clogged oil filter Condensate 'A'	Booster Pump
6	YPXMALSE_77 to 50	C-BOP	Inadvertent opening of a SRV	/
7	YFFWPPSS_11 YAFWPPDE_9	R-ATC	Loss of CY – Rapid Plant Shu	utdown
8	RAT_B_OVERCURRENT YARIMVFP_2 = 0 ED17B221C1FO YPXMALSE_511	M-All	LOCA/RAT trip/E51-F013 Fai Feed Breaker Failure/TAF Blo	lure/Div 3 ERAT owdown
9	YP_XMFTB_4106 lp11acld001fsp=True	C-BOP	LPCS Fails To Auto Start LPCS Injection Valve 1E21F0 Open at 472 psig RPV pressu)05 Fails to Auto ure
*	(N)ormal, (R)eactivity, (I)nstru	ment, (C)ompone	ent, (M)ajor	

Scenario No.: 1

Narrative Summary

Event

1. Secure DG 1C

Division 3 DG is running in parallel with RAT 'B' IAW CPS 9080.03, Diesel Generator 1C Operability – Manual and Quick Start Operability. Following shift turnover, the SRO will direct the BOP operator to unload and secure DG 1C and place it back in standby.

Scenario Outline

Description

2. DG 1C Overspeeds When Unloaded

When the BOP opens the output breaker for DG 1C in event 1, annunciators 5062-2C TRIP/LOCKOUT DIESEL GEN 1C, 5062-4C OVERSPEED DIESEL GEN 1C, 5062-5C TRIPPED DIESEL GEN 1C ENGINE and 5062-6C TROUBLE DIESEL GEN 1C come in due to an overspeed trip of the Div 3 DG. The overspeed trip will result in a lockout of the Div 3 DG, rendering the DG inoperable and unavailable. The field operator stationed in the Div 3 DG Room will confirm MCR indications. Technical Specification 3.8.1 Condition B (one required DG inoperable) will be entered and appropriate actions taken.

3. CRD high temperature

Annunciator 5006-1G CRD HYDR TEMP HI is received. The ATC operator will dispatch a field operator to the local recorder on 1H22-P007 to determine rod 52-25 is alarming. The ATC operator will note that rod 52-25 is currently at position 48 and IAW CPS 3304.01 Control Rod Hydraulic & Control (RD) perform an extended coupling check. The annunciator will clear for ~ 30 seconds and then alarm again. The ATC operator will then insert rod 52-25 to position 46 which will clear the high temperature condition.

4. Failure of 0RIX-PR001 Ch 15 - Low flow due to sample pump failure

A channel (15) trouble - flow out of limit is received on the MCR AR/PR LAN for 0RIX-PR001 HVAC Exhaust Stack PRM #1. The BOP will identify a low flow condition. The SRO will declare 0RIX-PR001 inoperable and enter ODCM 3.2.2 Conditions A and C. The SRO will direct the BOP to place 0RIX-PR002 in service and exit ODCM actions.

5. Clogged Oil Filter Condensate Booster Pump 'A'

Annunciator 5001-1H CLOGGED OIL FILTER CB PUMP 1A will be received. An Equipment Operator will be dispatched to turn the CUNO filter handle several times in an attempt to clear the alarm, but will be unsuccessful. The SRO will direct the ATC to start a non-running Condensate Booster Pump and secure CB Pump 1A per CPS 3104.01 Condensate/Condensate Booster (CD/CB), section 8.2.2 Starting Additional/Shifting Condensate Booster Pumps.

6. Inadvertent opening of a SRV

Annunciators 5066-5B ADS OR SAFETY RELIEF VALVE LEAKING and 5067-8L SRV MONITORING SYSTEM TROUBLE come in due to SRV 1B21-F041G failing ~ 50 % open. The BOP operator will diagnose and determine the problem is with 1B21-F041G. The SRO will direct the BOP operator to sound the containment evacuation alarm and coordinate with the ATC and attempt to close the SRV IAW CPS 4009.01 Inadvertent Opening Safety/Relief Valve. The SRO will enter and execute CPS 4005.01 Loss of Feedwater Heating and direct the ATC to restore and maintain reactor power at or below the original power level. SRV 1B21-F041G will shut when the first fuse is <u>simulated</u> removed for the associated 'A' solenoid at 1H13-P661.

7. Loss of CY – Rapid Plant Shutdown

The scenario starts with the 'B' CY Pump out of service. In this event the shaft shears on the running CY Pump (0CY01PC). The BOP operator will start the 'A' CY Pump and secure the 'C' CY Pump. However, the 'A' CY pump capacity begins to degrade and annunciator 5014-2B Low Press Cycle Cond Xfer Pump Disch Hdr will be received. Due to the complete loss of CY system pumps, the crew will perform a Rapid Plant Shutdown and attempt to scram the reactor per CPS 3208.01 Cycled / Makeup Condensate (CY/MC).

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Scenario Outline

Form ES-D-1

Narrative Summary (cont.)

Event

Description

8. LOCA/RAT Trip/E51-F013 Failure/Div 3 ERAT Feed Breaker Failure/TAF Blowdown

When the unit is scrammed in event 7, the Main Generator will trip on reverse power (normal post-scram response). When Generator Output Gas Circuit Breaker (GCB) 4506 opens, a lockout of RAT 'B' results in a loss of non-vital 4160 and 6900 volt power, resulting in a loss of Feedwater and Control Rod Drive as injection sources. Additionally, the ERAT Feed Breaker to 4160V Bus 1C1 fails to close, resulting in de-energization of 4160V Bus 1C1 resulting in loss of HPCS as a feed source, and the RCIC injection valve will fail to open remotely and manually. This will complete the loss of all high pressure feed sources to the RPV. A LOCA will then commence, resulting in a loss of RPV inventory and causing DW pressure to increase. The LOCA will escalate, causing RPV level to fall to TAF, requiring an emergency depressurization to be performed (ADS fails to automatically initiate).

9. LPCS Fails To Auto Start / LPCS Injection Valve 1E21F005 Fails to Auto Open at 472 psig RPV pressure

The Low Pressure Core Spray Pump will fail to auto start when DW pressure reaches 1.68 psig and will have to be manually started (critical task). In addition, 1E21-F005 LPCS Injection Valve will fail to automatically open at 472 psig RPV pressure, requiring the injection valve to be manually opened to recover RPV level above TAF.

EOP

1, 3, 6

Critical tasks:

- RPV-1.1 Enter EOP-3 and blowdown on a failure of the Automatic Depressurization System to automatically initiate within 17.5 minutes of RPV level reaching -145.5 inches.
- RPV-1.2 Maximize injection to restore water level above -162" (TAF). For this scenario, the magnitude of the leak is such that RPV water level will not recover above TAF if LPCS is not manually initiated within 17.5 minutes of RPV level reaching -145.5 inches.

ILT 15-1 NRC Exam Scenario 2

ppendix	C D	Scenario O	utline	Form ES-D
Facility:	Clinton Power Station	Scenario No.:	2 Operating Test No.: 20	17-301
Examine	ers:		Operators:	
Initial C	onditions:			
► Mo ► We	eather conditions are calm an	d clear.		
Turnove	er:			
• Pric	prities for the shift are as follo	ws:		
• 5	Shift Generator Stator Cooling Pu Shifting GC Water Pumps (MCR)	umps IAW CPS 3110 to support upcomin	0.01 01Generator Stator Cooling (GC) s o corrective maintenance on GC Pump	ection 8.2.4 B.
• N	Maintain power at 99% throug	hout the shift.		
Event No.	Malf. No.	Event Type*	Event Description	
1	N/A	N-BOP	Shift Generator Stator Cooling (G	C) Pumps.
2	YP_XMFTB_4102	I-BOP TS-SRO	Spurious HPCS auto initiation	
3	A02_A01_02_10_TVM	C-ATC TS-SRO	RR Pump B high vibration	
4	N/A	R-ATC	Reduce power with Control Rods	
5	YP_XMFTB_3917	C-BOP	CCW Pump 1A trip	
6	YP_XMFTB_4965 YP_XMFTB_4963	C-ATC	RR Pump A trip/ATWS	
7	YPXMALSE_256 0.08% YAMSSIFP_4 YVMSSILK_8 YPXMALSE_256 0.5%	M-All	Unisolable MSL 'D' Leak / Multipl Containment Areas above max sa temperatures requiring blowdown	e Secondary afe
8	YP_XREMT_739	C-All	MSIVs fail to close on Group 1 is	plation signa
		www.ent. (C)amanan	opt (M)oior	
ŕ	(N)ormal, (R)eactivity, (I)nst	rument, (C)ompon	ent, (w)ajoi	

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Appendix D

Scenario Outline

Form ES-D-1

Scenario No.: 2

Narrative Summary

Event

Description

1. Shift Generator Stator Cooling (GC) Pumps The BOB will shift GC Water Pumps IAW CPS 3110 01Generate

The BOP will shift GC Water Pumps IAW CPS 3110.01Generator Stator Cooling (GC) section 8.2.4 Shifting GC Water Pumps (MCR) to support upcoming maintenance on 1GC01PB.

2. Spurious HPCS auto initiation

High Pressure Core Spray (HPCS) initiates with no operator action. The following annunciators are received: 5062-3C RUNNING DIESEL GEN 1C, 5062-4E HPCS PUMP AUTO START, 5064-1B AUTO START SSW PUMP 1C and 5064-4B AUTO START DG FUEL OIL XFER PUMP 1C. IAW CPS 3309.01 High Pressure Core Spray (HPCS), the crew will verify by at least two independent indications that misoperation in automatic is confirmed <u>or</u> adequate core cooling is assured. Once confirmed, the SRO will direct the BOP operator to secure HPCS. Technical Specification LCO 3.5.1 Actions B.1 and B.2 will be evaluated requiring verification by administrative means that the RCIC system is operable when required AND the HPCS system is restored to operable status within 14 days.

3. RR Pump B high vibration

Annunciator 5003-2K RECIRC PMP B MTR VIBR HI is received. BOP will determine 'B' RR Pump vibration levels are ≥20 mil P-P 'steady' on both probes. ATC will perform RR Loop 'B' Emergency Shutdown. SRO will enter CPS 4008.01 Abnormal Reactor Coolant Flow, CPS 4002.01 Abnormal RPV Level/Loss of Feedwater At Power and ITS LCO 3.4.1 B.1 and C.1.

4. Reduce power with Control Rods

Due to the RR Pump 'B' Emergency Loop Shutdown and using CPS 3005.01 Unit Power Changes (Figure 1: Stability Control & Power/Flow Operating Map), the crew will identify a MELLA Limit violation. Per CPS 3005.01 Unit Power Changes, section 6.5 MELLA Limit Operational Concerns, the SRO will enter Action A.1 for ITS 3.2.1, 3.2.2 and 3.2.3 to restore power distribution limits within 2 hours and direct the ATC to promptly lower power via reverse rod sequence or CRAM RODS. Additionally, the SRO will direct ATC to lower reactor power to ≤58% RTP IAW TS LCO 3.4.1 B.1 based on having one recirculation loop in operation.

5. CCW Pump 1A trip

The following annunciators are received: 5040-1B AUTO TRIP PUMP/MOTOR, 5040-2C LOW PRESS CCW HX OUTLET HEADER and 5003-3D/3K RECIRC MTR A/B WDG CLG WTR FLOW LO are received. BOP will observe that CCW Pump 1A has tripped, review the ARP and start a standby CCW pump.

6. RR Pump A trip/ATWS

Annunciator 5003-1F RECIRC PMP A MTR BRKR Trip is received due to a trip of the 'A' RR Pump. With no RR Pumps operating with the mode switch in RUN, the ATC will insert a manual scram (IAW CPS 4008.01 Abnormal Reactor Coolant Flow) and shut 1B33-F023A RR Pmp Suction VIv. When the mode switch is placed in shutdown, the reactor will fail to scram requiring entry into EOP-1 RPV Control and then transition into EOP-1A ATWS RPV Control. Control Rods will be successfully inserted when ARI is manually initiated. Once shutdown criteria is met, the SRO will exit EOP-1A and re-enter EOP-1 RPV Control.

7. Unisolable MSL 'D' Leak / ATWS / Multiple Secondary Containment Areas above max safe temperatures requiring blowdown

Multiple annunciators are received due to an unisolable MSL 'D' leak into the Aux Building Steam Tunnel (secondary containment). The SRO will enter 4001.01 Reactor Coolant Leakage offnormal and EOP-8 Secondary Containment Control. Temperatures will continue to rise in the Secondary Containment, and when two or more areas exceed max safe temperatures, the SRO will enter EOP-3 Emergency RPV Depressurization and will direct a blowdown to be performed.

8. MSIVs fail to close on Group 1 isolation signal Condenser vacuum will continue to degrade causing the Main Turbine and the TDRFPs to trip. The MSIVs fail to automatically close but can be manually closed from the MCR.

Scenario Outline

EOP

1, 3, 8

Critical tasks:

- RPV-5.1/6.1 ATC/BOP inserts control rods and/or starts Standby Liquid Control Pumps to shutdown the reactor.
- SC-1.2 SRO enters EOP-3 and performs a blowdown when 2 or more areas are above the max safe value of the same parameter (Table T, U, W), and a Primary System is discharging into the Secondary Containment, which cannot be isolated. If the crew Anticipates Blowdown using bypass valves, and in doing so two areas do not reach a max safe condition, then this critical task is considered to be met. (PRA)

ILT 15-1 NRC Exam Scenario 3

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Appendix	D	Scenario Ou	Itline Form	ES-D-1			
Facility: Clinton Power Station		Scenario No.:	3 Operating Test No.: 2017-301				
Examine Initial Co • Mo • We • SF	onditions: de 1 at ~10% power. eather conditions are calm an System is secured to suppor	d clear. t surveillance testi	Operators:				
 CPS 3002.01 Heatup and Pressurization is complete with the exception of placing a TDRFP in rolling standby (to be performed at 15% power). CPS 3004.01 Turbine Startup and Generator Synchronization is in progress. Section 5.0 Prerequisites are complete. Steps 8.1.1 – 8.1.4 are complete. Step 8.1.5 will be performed after placing a TDRFP in rolling standby. On Step 12. Gang 3C is at position 48. Priorities for the shift are as follows: ○ Perform CPS 9061.03C012 Week 12 – CM, SF, SM, LD ISOL Valve Operability Checklist sections 8.12.6 and 8.12.7 (Method B). Do <u>NOT</u> restart SF after the completion of 9061.03C012/D012. ○ Continue with power ascension to 15% IAW Step 8.1.6 of CPS 3004.01. The RE has requested single rod, single notch rod motion. After reaching 15 % power: ○ Place TDRFP 'A' in rolling standby IAW Step 8.6.3 of CPS 3002.01. ○ Perform Turbine Roll IAW Step 8.1.8 of CPS 3004.01 							
Event No.	Malf. No.	Event Type*	Event Description				
1	N/A	N-BOP	Perform 9061.03C012 Week 12 – SF Val Operability Checklist	ve			
2	NA	R-ATC	Raise power with rods to 15%.				
3	ROD1233TFIA5	C-ATC TS-SRO	Uncoupled Rod				
4	Rod4433TFIA4	C-ATC	Control Rod difficult to withdraw				
5	A05_A02_A0204_1_TVM ; A05_A02_A09DS08_1	C-BOP TS-SRO	RCIC failure to auto isolate on an isolatio signal	n			
6	SA01B1SA1CFO SA01B0SA1CFTC	C-BOP	#1 SA Compressor trips with failure of Standby Compressor to Auto Start				
7	Seismic_Value 0.25g Multiple Annunciators YPXMALSE_239 YP_XMFTB_4963	M-All	Earthquake Loss of Main Condenser vacuum ATWS				
8	ed01LMalfMot(19)	C- All	CRD Pump 'B' Trips During ATWS				
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor							

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Appendix D

Scenario Outline

Scenario No.: 3

Narrative Summary

Event

Description

1. Perform 9061.03C012 Week 12 – SF Valve Operability Checklist The SRO directs BOP to perform CPS 9061.03C012 Week 12 - SF Valve Operability Checklist sections 8.12.6 and 8.12.7 (Method B).

2. Raise power with rods to 15% The crew will continue the power ascension to 15% by withdrawing control rods in accordance with CPS 3004.01 Turbine Startup and Generator Synchronization.

3. Uncoupled rod

When the first in-sequence control rod (12-33) reaches position 48, the ATC will perform a coupling check IAW CPS 3304.02 Rod Control And Information System (RC&IS) section 8.1.10 Coupling Check by applying a continuous withdraw to the rod at position 48. Annunciator 5006-5G Rod Overtravel will be received, indicating that the control rod has become uncoupled from its drive mechanism. The operating crew will attempt to recouple the control rod IAW the annunciator response procedure. The SRO will evaluate and enter ITS 3.1.3 Condition C until the control rod is successfully recoupled.

4. Control Rod difficult to withdraw

Control Rod 44-33 will not withdraw when using normal drive differential pressure. The crew will perform actions for a difficult to withdraw control rod IAW CPS 3304.01 Control Rod Hydraulic & Control (RD) Section 8.3.4 Control Rod Difficult to Withdraw. When drive dP is increased to 300 psid, the control rod withdrawal will be successful, allowing the power ascension to continue.

5. RCIC failure to auto isolate on an isolation signal Annunciator 5063-4A RCIC DIV 2 STEAM LINE DIFF PRESS HIGH is received. BOP will observe that 1E51-F063 and F076 have failed to automatically shut and will manually shut them and trip the RCIC turbine. SRO will enter Tech Spec LCO 3.5.3 RCIC System Action A.1 and A.2, and LCO 3.3.6.1 Primary Containment and Drywell Isolation Instrumentation Action D.1.

6. #1 SA Compressor trips with failure of Standby Compressor to Auto Start Annunciator 5041-1A AUTO TRIP PUMP/MOTOR is received due to a trip of the #1 Service Air

Compressor (1SA01C). The SRO will enter CPS 4004.01 Instrument Air Loss and direct the BOP to start the standby Service Air Compressor (0SA01C). If the crew fails to manually start 0SA01C, the air compressor will fail to automatically start to restore air pressure.

7. Earthquake/Loss of Main Condenser Vacuum/ ATWS

Annunciators 5009-1A ACCL EXCDED SAFE SHUTDN EARTHQKE, 5009-2A ACCL EXCDED SEIS SW/OPER BAS EARTHQKE, 5009-2B ACCL EXCDED OPER BAS EARTHQKE and 5009-3A ACTIVATED SEIS RCDR are received. SRO enters CPS 4301.01 Earthquake. BOP observes status lights on the Seismic Warning Panel and determines that an OBE Earthquake has been exceeded. The earthquake causes a vacuum leak in the Main Condenser. The MCR will take actions for degrading vacuum IAW CPS 4004.02 Loss of Vacuum. Efforts to determine the location of the vacuum leak will be unsuccessful. When it is determined that vacuum cannot be controlled above 24" Hg vac, the SRO will direct the ATC to perform a Rapid Plant Shutdown or to scram the reactor. When the ATC places the Reactor Mode Switch in shutdown/attempts manual scram or ARI, control rods fail to insert. The SRO will enter EOP-1 RPV Control and transition to EOP-1A ATWS RPV Control. The SRO will direct the BOP to start SLC and the ATC to insert control rods per EOP-1A.

8. CRD Pump B trips during ATWS

CRD Pump 'B' will trip 15 seconds after the Reactor Mode Switch is placed in Shutdown during Event 7, causing a loss of Control Rod Hydraulic (RD) Drive pressure and inability to insert control rods. The Crew will take actions to restore RD Drive pressure by starting the 'A' RD Pump.

Scenario Outline

EOP

1, 1A

Critical tasks:

- RPV-6.1 BOP/ATC inserts control rods and/or starts Standby Liquid Control Pumps to shutdown the reactor.
- (Conditional) RPV-6.2 BOP Inhibits ADS (only if level challenges Level 1)
- RPV-6.3 BOP and ATC terminates and prevents injection IAW Detail F1 to lower level to reduce subcooling or to lower level to decrease reactor power.
- RPV-6.3 BOP terminates and prevents injection from HPCS
- RPV-6.4 ATC controls RPV level between TAF and -60" (PRA).