

Simulation Facility: Byron

Scenario No.: Operating Test No. **2016 Byron NRC N16-1 Rev 1**

Examiners:

Applicant:

SRO

RO

BOP

Initial Conditions: IC-16

Turnover: Unit 1 is operating at 54.0% power due to a grid issue, steady state, equilibrium xenon, Boron concentration is 998 ppm. The fuel is preconditioned to 100% power. Online risk is green.

Event No.	Malf. No.	Event Type*	Event Description
1	None	N (BOP, SRO)	Swap stator cooling pumps.
2	MF NI09D	I (RO, SRO) TS (SRO)	N44 failure high
3	None	R (RO, SRO)	Raise power at 0.4 Mw/Min
4	MF CC01B	C (BOP, SRO) TS (SRO)	1A CC pump trip with 1B CC pump autostart failure
5	MF CV08 0 5	C (RO, SRO)	Letdown line pressure detector 1PT-CV131 fails low
6	MF RX02D	C (BOP, SRO)	1D FWRV oscillates in auto
7	MF FW09D	C (SRO)	1D FWRV fails closed resulting in a reactor trip
8	MF TH06C	M (all)	LOCA
9	MF SI01A RF RP84 MF RP15D	C (BOP, SRO)	1A SI pump failure to start & ESF relay failure of 1B SI pump – manual start required

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

## SCENARIO OVERVIEW

Unit 1 is operating at 54.0% power due to a grid issue, 606 MWe, steady state, equilibrium xenon, Boron concentration is 998 ppm, CBD at 150 steps. The fuel is preconditioned to 100% power. Online risk is green. Following completion of turnover, the shift manager requests the BOP to swap GC pumps in preparation for an OOS on 1GC01PA next shift.

**After completing shift turnover and relief**, the BOP will swap stator cooling pumps per BOP GC-5.

**After swapping stator cooling pumps**, N-44 fails high, causing CB D to step in. The RO will place rod control to MANUAL after verifying no turbine load shedding is in progress or upon seeing the PRNI failure. 1BOA Inst-1 will be entered, and Tech Spec 3.3.1 will be entered.

**After the N-44 failure is addressed**, the crew will ramp the unit up at 0.4 MW/minute to 88% power, using 1BGP 100-3, Power Ascension.

**After a measurable change in power is observed**, the 1A CC pump will trip and the 1B CC pump will fail to automatically start. The BOP should start the 1B CC pump manually. 1BOA Pri-6 may be entered, and Tech Spec 3.7.7 will be entered.

**After the 1B CC pump has been started and the failure has been addressed**, letdown pressure transmitter 1PT-131 will fail low. The letdown PCV will close and letdown pressure will rise lifting the letdown line relief valve. The RO will take manual control of letdown pressure controller and restore letdown pressure. The crew may isolate letdown due to the lifting letdown relief valve. If letdown is isolated, it will be restored per 1BOA ESP-2 or BOP CV-17. On-line risk remains yellow.

**After the 1PT-131 failure is addressed**, 1FW-540, 1D FWRV will begin oscillating in AUTOMATIC. The BOP will take manual control and restore normal feedwater flow. AUTOMATIC operation of 1FW-540 will not be available for the remainder of the scenario.

**After normal feedwater flow is restored and the plant stabilized**, 1D FWRV will fail fully closed, causing a loss of feedwater to the 1D SG. The reactor will trip or be tripped, and the crew will enter 1BEP-0, and transition to 1BEP ES-0.1 at step 4 of 1BEP-0.

**After 1BEP ES-0.1 has been entered, and performed to Step 4**, a 5000 gpm leak develops in the 1C cold leg. The crew will manually initiate Safety Injection and re-enter 1BEP-0. BST's will be monitored at this time. 1A SI pump failed to start and will not start if a manual start is attempted. An ESF relay failure will prevent 1B SI pump from starting on the SI signal, but it can be manually started from the MCR. RCP trip criteria will be met, requiring the RCPs to be tripped.

**Completion criteria** is selection of and transition to 1BEP ES-1.2, Post-LOCA Cooldown.

### Critical Tasks

1. Establish flow from at least one high-head SI pump before transition out of E-0' (ERG Critical Task number – CT-7) (K/A: 006000A4.07; importance - 4.4./4.4)
2. Trip all RCPs before exiting 1BEP-0 Attachment B. (ERG Critical Task number – CT-16) (K/A: 000009EA1.09; importance - 3.6/3.6)

### References

BOP GC-5	1BOA ESP-2
BOP CV-5	1BEP 0
1BGP 100-3,	1BEP ES-0.1
1BGP 100-3T5	1BEP 1
1BOA Inst-1	1BEP ES-1.2
1BOA Pri-6	BOP CX-14