Final Submittal
(Blue Paper)

FINAL OUTLINES SCENARIOS

FINAL

Facility:	BRUNSWICK	Scenario No.:	1	Op Test No.:	**Final**
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)

Initial Conditions:	The plant is operating at 100% power, End of Cycle. No equipment is out of service
Turnover:	Following shift turnover, Reduce power and place the 2C Condensate Pump in service and remove the 2A Condensate Pump. The 2A Condensate pump is experiencing high vibrations and will be placed under clearance by the WCC for maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R-SRO R-RO	Reduce power to <92% power in order to swap Condensate Pumps.
2	N/A	N-SRO N-BOP	Swap Condensate Pumps per 2OP-32 section 8.5.
3	EE030M	C-RO C-SRO	2XB power failure. (TS)
4	NB007F	I-SRO I-RO	A Reactor Water Level Instrument failure. (TS)
5	K4517A Off	C-BOP C-SRO	TBCCW Pump Trip
6	MS031F	C-BOP C-SRO	MTLO controller failure
7	MS017F	M-ALL	Turbine high vibration requiring turbine trip and scram resulting in an ATWS condition requiring entry to LPC.
8	K5416A Off	C-ALL	EHC pump trip and failure of standby pump causing bypass valve failure.
9	K2119A Off	C-RO C-SRO	SLC pumps will not start due to switch failure. (TS)
10	RD036F	C-RO C-SRO	Scram discharge volume drains fail closed.
11	K1208A Off	C-BOP C-SRO	E11-F048A will initially trip on thermal overload when closed.
12	N/A	M- ALL	Torus temperature rises requiring anticipating emergency depressurization / emergency depressurization due to HCTL.

SCENARIO DESCRIPTION

Unit 2 is operating at maximum power, End Of Cycle.

Event 1 - Direction in the turnover has the crew remove the A condensate pump from service which requires a power reduction to less than 92% power in accordance with ENP-24.

Event 2 – Swap condensate pumps in accordance with 2OP-32.

Event 3 - 2XB will fail. The crew will respond per APPs and refer to TS to declare RHR B Loop inoperable (3.5.1 Action A) and PCIV's 3.6.1.3 Action A (8 hours to isolate the affect flowpath) and B (2 hours to isolate the affected flowpath).

Event 4 – Reactor Feed Pump will trip with a failure to runback to limiter #2. Crew should enter AOP-23. Immediate operator action to reduce Recirc controllers to 40% if a RFP trips and a runback does not occur.

Event 5 - The A RBCCW pump shaft will shear with the standby pump failing to auto start. AOP-16 should be entered and the standby pump started to recover system pressure.

Event 6/7/8 - The main turbine lube oil controller will fail closed causing the lube oil to heat up and vibrations to occur on the main turbine. This will require the main turbine to be tripped (>12 mils on bearing 1-8 and >10 mils on bearings 9/10) and the reactor to be scrammed. Most control rods will fail to insert on the scram. The crew will respond to the ATWS per EOP-01-LPC. When the scram occurs, the running EHC pump will trip and the standby EHC pump will also trip thus causing a failure of bypass valves.

Event 9 - When SLC initiation is attempted, neither SLC pump will start due to switch failure. The crew will enter LEP-03 and align for alternate boron injection using CRD.

Event 10 - When scram jumpers are installed the scram discharge vents and drains will fail to open which will result in inability to insert control rods by resetting RPS and inserting additional manual scrams.

Event 11 - Suppression pool temperature will rise requiring entry into EOP-02-PCCP and lowering water level per LPC Table 3. When RPV level is lowered to TAF, reactor power will still be above the APRM downscale set point. Suppression pool cooling is required due to elevated suppression pool temperature. Suppression pool cooling is limited to RHR A. The E11-F024A will initially trip on thermal overload when opened. If the crew requests, the thermal overload can be reset and the valve can then be opened, after actions are taken to reduce reactor pressure.

Event 12 – When level has been lowered and injection re-established, the scram discharge volume vents and drains will be repaired. Control rods can then be inserted by manual scram. When level is restored above TAF, RHR Loop A can be placed in suppression pool cooling. When all control rods are inserted and suppression pool cooling initiated, the scenario may be terminated.

Facility:	BRUNSWICK	Scenario No.:	2	Op Test No.:	**Final**
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)

Initial Conditions: The plant is operating at 100% power, Middle of Cycle.
APRM 2 is INOP and Bypassed.

Turnover: Transfer 2A SJAE Train to FULL LOAD and secure 2B SJAE Train IAW 2OP-30.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-SRO N-BOP	Transfer 2A SJAE Train to FULL LOAD, secure 2B SJAE Train
2	NI032F	I-SRO (TS) I-RO	APRM 3 fails downscale
3	CN001F	R-RO	Small condenser leak causes lowering vacuum. (AOP) RO reduces reactor power with recirc flow to stabilize vacuum >25".
4	ZUA125	C-SRO C-BOP	Large debris causes "B" Circ. Water Screen to stop; "CIRC SCREEN Hi DP or STOPPED" alarm; Swap Circ. Pumps per OP
5	CW023F	C-SRO (TS) C-BOP	NSW Pump Trip, failure of STBY pump to auto start, manual start req'd; (AOP-18)
6	ES002F	C-SRO C-RO	SRV "E" fails open. (AOP-30) Pull fuses to close SRV; Possible PCCP entry; Place torus cooling in service.
7	RW013F/15F/ 16F	M-ALL	Un-isolable RWCU leak, SCRAM, Loss of Vacuum; (AOPs, EOPs)
8	ES028F	C-SRO C-RO	HPCI injection valve fails to auto open
9	N/A	M-ALL	Emergency Depressurization (EOPs)
10	K1507A K1512A	C-BOP	Failure of two ADS valves to open, manually open two additional SRV's; Scenario ends when reactor pressure reaches 50#

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

Scenario Description

Event 1 – BOP operator will transfer SJAE 2A to FULL load using 2OP-30 Section 8.1. Task requires some component manipulations and parameter monitoring.

Event 2 – APRM 3 will fail downscale. With APRM 2 already bypassed requires placing in trip by placing Module in INOP and T.S. evaluation.

Event 3 – A small condenser leak which will cause condenser vacuum to slowly lower. Crew should enter AOP-37. SRO should direct RO to lower reactor power to stabilize vacuum. Once power has been reduced at least 5%, vacuum will stabilize.

Event 4 – Large piece of debris will lodge in 2B CW traveling screen. "CIRC SCREEN A HIGH DP or STOPPED" will alarm on panel UA-1. Crew will reference APP and dispatch AO to investigate. AO will report that screen is jammed and will not move. Per the direction of the APP, crew will start an available CW pump and secure 2B CW pump.

Event 5 – The running NSW pump will TRIP on motor overload. The STBY NSW pump will fail to AUTO start. The BOP operator should recognize the failure and manually start the STBY NSW pump. System parameters will return to normal. SRO should address T.S. implications. AOP-18 entry.

Event 6 – SRV "E" will fail full open. Crew will enter AOP-30. Immediate operator actions are unsuccessful in closing the SRV; pulling fuses per supplementary actions will close SRV.

Event 7 – A large un-isolable RWCU leak will occur. Crew will enter AOP-5.0 and SCCP. SRO should direct a SCRAM. Original vacuum leak will worsen causing a complete loss of vacuum. Group 1 isolation will occur due to loss of vacuum.

Event 8 – HPCI injection valve will fail to open if HPCI AUTO initiation is received. Manual operation will open injection valve.

Event 9 – Secondary containment conditions will worsen, forcing the SRO to direct an Emergency Depressurization due to high water levels.

Event 10 – Two ADS SRV's will fail to manually open. SRO should direct opening two additional SRV's. Scenario will end when reactor pressure reaches 100#.

Facility:	BRUNSWICK	Scenario No.:	3	Op Test No.:	**Final**
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)

Initial Conditions: Reactor power is 60% with power ascension in progress per GP-04

Turnover: GP-04 is complete thru step 5.2.21. Continue with step 5.2.22 to place the second reactor feed pump is service in accordance with 2OP-32.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP SRO	Place second reactor feed pump in service
2	N/A	R – RO SRO	Raise reactor power to 70% with recirc.
3	RD001M	C – RO TS - SRO	Control rod drift (TS)
4	ES022F	I – BOP TS - SRO	Inadvertent HPCI Initiation (TS)
5	RD187F	C – RO SRO	CRD pump trip; start STBY CRD pump
6	IAUPB2A6	C – BOP SRO	Power loss to Main Stack Rad Monitor; SBGT system failure to start
7	NB006F RP008F	M - All	Main steam line leak in primary containment / SCRAM / ATWS
8	K1227A K1J36A	C – BOP SRO	Drywell Spray required; spray valve failures prevent sprays
9	N/A	M - All	Emergency Depressurization with low power ATWS

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

Scenario Description

Event 1 – Following shift turnover the BOP operator will place the second reactor feed pump in service.

Event 2 – When the second reactor feed pump is in service, the RO will be directed to raise reactor power to 70% using recirc. per the nuclear engineers direction.

Event 3 – A fully withdrawn control rod will drift full in. The crew will enter AOP-2.0 Control Rod Malfunction/Misposition. AOP-2.0 will direct response per 2APP-A-05 (3-2) ROD DRIFT. The RO should attempt to arrest the drifting control rod.

Event 4 – An inadvertent HPCI initiation will occur. The crew will respond by verifying no initiation signal is present and securing HPCI. The HPCI trip pushbutton will fail to operate requiring HPCI shutdown by other means. If injection occurs, crew will enter AOP-3.0 Positive Reactivity Addition.

Event 5 – The running CRD pump will trip. The crew should respond by placing the STBY CRD pump in service in accordance with the OP.

Event 6 – Power to the Main Stack Radiation Monitor will be lost resulting in a Gp. 6 Isolation. SBGT system will fail to start as required. The crew must diagnose the failure of SBGT and start manually to maintain secondary containment integrity.

Event 7 – A main steam line leak inside primary containment will cause drywell pressure and temperature to rise. The crew should scram the reactor before 1.7 psig or an auto scram will occur. Five control rods will fail to insert following the scram requiring entry into LPC and PCCP.

Event 8 – Containment parameters will worsen requiring drywell and torus sprays. A combination of failures will prevent drywell sprays from occurring.

Event 9 – Drywell temperature will approach or exceed 300F with no drywell sprays available. SRO will direct an Emergency depressurization. Only 6 SRVs will open requiring depressurization to 140 psig prior to reestablishing injection. When reactor water level is restored, the scenario will terminate.

Facility:	BRUNSWICK	Scenario No.:	4	Op Test No.:	**Final**
Examiners:	_____	Operators:	_____		(SRO)
	_____		_____		(RO)
	_____		_____		(BOP)

Initial Conditions:	Unit Two (2) is operating at 6% power. Reactor startup is in progress per GP-03. GP-10 sequence A2X is complete through step 278.
Turnover:	Continue with GP-03 actions to raise reactor power to 10% in preparation for placing the Mode switch to RUN.

Event No.	Malf. No.	Event Type*	Event Description
1		R-RO SRO	Raise reactor power by pulling control rods
2	RD012M	C-RO SRO	Stuck control rod
3	RD191F	I-RO (TS)	RWM critical self test fault / Bypass RWM
4	RD016M	C-RO (TS)	Uncoupled control rod
5	ZUA343	C-BOP SRO	Clogged Off-gas filter / Swap filters
6	CW036F	C-BOP (TS)	CSW pump overload / Swap pumps
7	CF035F	C-BOP SRO	SULCV fails closed / lowering reactor water level
8	EE020F	M-ALL I-BOP	Loss of SAT / DG4 trip / DG3 frequency drift / AOP-36.1
9	DG008F	M-ALL	DG3 output breaker trip / Station Blackout / AOP-36.2

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

Scenario Description

Event 1 - The crew will continue raising power by pulling control rods in preparation for placing the Mode switch to RUN. Rods pulls will commence at step 279 of the A2X sequence.

Event 2 - When the RO attempts to pull Control rod 06-15, it will stick at the full in position. The crew will respond per the direction of OP-07 RMCS Operating Procedure.
The rod will unseat on the second sequence of step 8.1.2.2 of OP-07.

Event 3 - The RWM will fail requiring the SRO to address Tech Specs and implement contingency rod manipulation actions.

Event 4 - When control rod 26-51 is withdrawn to position 48 a "rod over travel" alarm will be received. The crew will take the actions of the APP and drive the control rod full in.

Event 5 - The clogging of the in-service Off-gas Filter will cause the "Off-gas Filter Hi DP" alarm. The crew will respond per the APP and swap off-gas filters per the OP-30.

Event 6 - An overload alarm will be received on CSW pump 2B. The crew will respond by starting the 2C CSW pump and shutting down the 2B CSW pump.

Event 7 - The SULCV will fail closed stopping feed flow to the vessel. Reactor water level will drop requiring action to re-establish flow to the vessel.

Event 8 - The SAT will trip and lockout resulting in a loss of off-site power. DG4 will auto start and trip on differential overcurrent. DG3 will fail to auto start. Auto start pushbutton in control room will also not work. Manual control room start will be successful in starting DG3. AOP-36.1 is entered and executed.

Event 9 - DG3 frequency will drift requiring the operator to take action to correct. Four minutes after DG3 starts the DG3 output breaker will trip. Station Blackout conditions exist. AOP-36.2 will be entered and executed.