

Scenario Event Description  
DAEC 2013 NRC Scenario 1

ES-D1

Facility:	DAEC	Scenario No.:	1	Op Test No.:	2013 NRC
Examiners:	_____	Operators:	SRO -		
	_____		RO -		
	_____		BOP -		
Initial Conditions:	<ul style="list-style-type: none"> <li>• Reactor is at 100% power</li> <li>• Well Water Pump "C" inoperative because of suspected cracks in the discharge piping. Maintenance is investigating.</li> </ul>				
Turnover:	<ul style="list-style-type: none"> <li>• CV-1579, A Feed Reg Valve is presently locked.</li> <li>• "B" Feedwater Regulating Valve is in AUTOMATIC controlling RPV level per the ARP.</li> <li>• Investigation revealed the cause to be a blown fuse internal to the Feed Reg Valve controller.</li> <li>• Technicians have completed all troubleshooting and repairs on CV-1579, Feed Reg Valve controller.</li> <li>• The crew is directed to reset the locked Feed Reg Valve in accordance with ARP 1C05A (F-1), "A" or "B" Feed Reg Valve Position Locked, Section 4.</li> </ul>				
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Lockout ADS</li> <li>2. Terminate &amp; Prevent Injection</li> <li>3. Insert all control rods</li> </ol>				
Event No.	Malfunction No.	Event Type*	Event Description		
1		R - RO R - SRO	Lower power to 95% to allow for any power excursions when CV-1579, A Feed Reg Valve lockout is reset.		
2	FW16a (reset)	N - BOP N - SRO	Reset the locked CV-1579, A Feed Reg Valve IAW ARP 1C05A (F-1)		
3	NM11B	I - RO I - SRO TS - SRO	"B" APRM Flow Unit fails downscale  1C05A, E-2, TS 3.3.1.1-1		
4	DI-ED-051 (TRIP then return to NAC ED07E)	C-BOP C-SRO TS-SRO	1B303 Trip with failure to auto transfer to the alternate power supply (Power will still be lost to "A" SBLC, "A" SBGT, "A" Core Spray and RHR components)  ARP 1C08A C-5 and D-5, TS 3.8.7.A		

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5	FW12A	C-RO C-SRO	<p>“A” Feed Reg Valve failure</p> <p>AOP 644</p>
6	AD01G	C - BOP C - SRO	<p>SRV leak and Fast Power Reduction IAW IPOI-4, valve does NOT close a scram is required</p> <p>AOP 683, IPOI-5, EOP-2, (There should may not be sufficient time to enter TS 3.4.3.A)</p>
7	RP05A,B,C ,D,E	M-ALL	<p>Electrical ATWS,</p> <p>EOP-ATWS</p>
8	SL01B	C-BOP C-SRO	<p>“B” SLC Pump trips after starting</p> <p>SEP 304</p>
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			

### **DAEC 2013 NRC Scenario #1**

The scenario begins with the plant at 100% power. The crew is directed to lower power to 95% to allow for any power changes that may occur when they reset the locked Feed Reg Valve in accordance with ARP 1C05A (F-1). After the Feed Reg valve is reset and proper operation verified, the “B” APRM flow unit will fail downscale causing a half scram and rod block. The crew must diagnose the failure and bypass the APRM flow unit. The SRO will enter Technical Specifications 3.3.1.1 for the failed instrument.

After the Technical Specification is addressed breaker 1B303 will trip and the automatic transfer to the alternate power supply will fail, resulting in a loss of an Essential Bus 1B34. This results in a loss of the “A” SBLC, “A” SBT, “A” side Core Spray and RHR components. The crew will enter the ARPs to take actions and the SRO must address Technical Specification TS LCO 3.8.7.A. The SRO may discuss the need to enter TS LCO 3.0.3 when the swing bus is de-energized. The crew may recover 1B34A/1B44A LPCI Swing Bus, by manually closing 1B4401.

After the actions are taken for the trip of 1B303, a previous problem with the “A” Feedwater Regulating Valve will re-occur and the controller will fail. The operators must take manual control of feedwater to control RPV level IAW the abnormal procedure AOP-644, FW/Condensate Malfunction. After the crew has established manual control of RPV water level an SRV will fail open requiring a power reduction. The SRO may address Technical Specifications but the SRV will not close requiring a reactor scram. An RPS failure will occur and an electrical ATWS will result. EOP-1 and EOP-ATWS will be entered. The “B” SLC Pump will trip shortly after starting and the crew must implement SEP 304, Boron Injection Using RWCU. The crew will take actions to Lockout ADS (**Critical Task**), Terminate and Prevent Injection (**Critical Task**) and insert all control rods (**Critical Task**).

The scenario may be terminated when all rods are full in and RPV level has been restored to normal.

Scenario Event Description  
DAEC 2013 NRC Scenario 2

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Facility:	DAEC	Scenario No.:	2	Op Test No.:	2013 NRC
Examiners:	_____	Operators:	SRO -		
	_____		RO -		
	_____		BOP -		
Initial Conditions:	<ul style="list-style-type: none"> <li>• Startup in progress IAW IPOI-02 - At step 20 of pull sheet</li> <li>• Reactor Pressure is about 390 psig</li> </ul>				
Turnover:	<ul style="list-style-type: none"> <li>• Continue with startup IAW IPOI-02, Step 4.2. Step 10</li> <li>• I &amp; C is performing a visual check on NI cabinets</li> <li>• RPV level is being maintained low in the green band in preparation for startup of first feedwater pump</li> <li>• Two Condensate Demineralizers are in service and two are in Standby</li> <li>• Place the "B" Feedwater pump in service IAW OI 644</li> </ul>				
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Initiate a manual scram prior to torus level reaching 7.1 feet</li> <li>2. Emergency depressurize prior to torus level reaching 7.1 feet</li> </ol>				
Event No.	Malf. No.	Event Type*		Event Description	
1	N/A	N - BOP N - SRO		Startup the "B" feedwater pump IAW OI 644.	
2	N/A	R - RO R - SRO		Continue startup by withdrawing control rods IAW IPOI-02	
3	RD02-1819	C - RO C - SRO		Stuck Control Rod  AOP 255.1	
4	CS HS-2103	C-BOP C-SRO TS-SRO		"A" Core Spray Pump Spurious Start  TS 3.5.1.B and TS 3.3.5.1	
5A	ED08A	C - RO C - SRO TS-SRO		Loss of 4 KV bus 1A1 (Loss of Recirc due to loss of bus)  AOP 255.2 and AOP 264, TS 3.4.1 (LCO entry is Not required at this power level)	

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5B		C-BOP C - SRO	Loss of 4 KV bus 1A1 (Loss of 4 KV bus 1A1 and associated equipment)  AOP 304.1
6	ZZ02 NM04A	C – RO C - SRO TS-SRO	Small Seismic event causes IRM “A” to become Inoperative causing a half scram and causes the HPCI suction to swap to the Torus.  AOP-901, T.S. 3.6.1.F and T.S. 3.5.1.H
7	ZZ02 PC14	M - ALL	Larger Seismic event Torus Rupture requires scram and eventual ED  AOP-901, IPOI 5
8	CS01 CS02 DO-HP- 036	C – BOP C - SRO	Failure of CS and/or HPCI makeup to the Torus.  EOP 1, EOP 2, EOP 3, ED
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

### **DAEC 2013 NRC Scenario #2**

The scenario begins with reactor power at about 3% and a startup in progress. The crew will place the "B" feedwater pump in service IAW OI 644 and then continue the startup. While pulling control rods, control rod 18-19 will become stuck and require actions IAW AOP 255.1 to continue rod movement. The SRO may enter TS 3.1.3. Once the stuck rod is addressed, a spurious start of the "A" Core Spray pump will occur and the pump must be manually secured. The SRO will reference TS 3.5.1 .B and TS LCO 3.3.5.1 Condition A for functions 1a and 1b.

Once the Technical Specifications have been addressed a loss of Non Essential 4160v Bus 1A1 will occur. The crew will take actions IAW AOP 304.1, AOP 255.2 and AOP 264 and address the resultant Recirc Pump trip and also swap bus power supplies. The SRO will address TS for single loop operation, however on checking the T.S. the crew will determine that the actions are not required at this power level.

Once the power supplies have been swapped and the Technical Specifications identified, a seismic event will occur. The operators will take action IAW AOP 901 to monitor the plant. The seismic shock will cause IRM "A" to become inoperable requiring the RO to bypass the IRM. The torus will have received a shock and a small break will have developed. Additionally the earthquake will have caused a momentary torus level spike that causes the HPCI suction to shift to the Torus. IAW OI 152, Section 8 HPCI must be declared inoperable because the low pressure keep fill system is NOT in service. This requires entry into T.S. 3.5.1.F and 3.5.1.H. At that time unknown to the crew the HPCI CST suction will fail in the closed position.

A second seismic event will occur and the Torus will then develop a large unisolable leak. As torus level lowers the crew will attempt to make up to the torus, but efforts will be unsuccessful because the Core Spray manual CST suction valves cannot be opened and the HPCI CST suction valve has closed and will not open. A manual scram will be required (**CRITICAL TASK**) before Torus level lowers below 7.1 feet. Further lowering of Torus level will require an Emergency Depressurization (**CRITICAL TASK**).

The scenario may be terminated after the ED is performed and RPV level is returned to the normal operating band.

Scenario Event Description  
DAEC 2013 NRC Scenario 3

ES-D1

Facility:	DAEC	Scenario No.:	3	Op Test No.:	2013 NRC
Examiners:	_____	Operators:	SRO -	_____	
	_____		RO -	_____	
	_____		BOP -	_____	
Initial Conditions:	<ul style="list-style-type: none"> <li>• Reactor Power @100%</li> <li>• TS 3.5.1.B.1 – RHR LPCI – Day 1 of 30 day LCO, due to “B” RHR Pump inoperative because a fault in the motor winding. Maintenance expects repairs to be completed in 3 days. (Also T.S. 3.6.2.3)</li> </ul>				
Turnover:	<ul style="list-style-type: none"> <li>• Maintenance has requested the immediate securing of the “B” CRD Pump for a GE Service Bulletin that directs replacing the oil in the gear box. Remove the “B” CRD Pump from service IAW OI 255 – CRD Hydraulic System, Section 6.1</li> </ul>				
Critical Tasks:	<ol style="list-style-type: none"> <li>1. Terminate and prevent injection prior to emergency depressurization with control rods stuck out of the core.</li> <li>2. Emergency Depressurize when it is determined that drywell temp cannot be restored and maintained &lt;280°F</li> <li>3. Following emergency depressurization maintain reactor pressure below the Minimum Steam Cooling Pressure.</li> </ol>				
Event No.	Malf. No.	Event Type*	Event Description		
1	N/A	N-RO N-SRO	Remove the “B” CRD Pump from service IAW OI 255, Section 6.1		
2	FW07J	R-RO R-SRO	Loss of Feedwater Heating – 5B dump valve fails open – power reduction  AOP 646, AOP 255.2		
3	RR17B	C – RO C– SRO TS-SRO	“B” Reactor Recirc Pump speed controller fails downscale  AOP 255.2 TS 3.4.1		

4	RD11A RD070615 RD073435 RD073819	C-RO C-SRO TS-SRO	<p>"A" CRD Pump trips, Three CRD Accumulators alarm on low pressure. Permission is given to start standby pump IAW OI 255</p> <p>TS 3.1.5</p>
5A	ED08C	C-RO C-SRO TS-SRO	<p>Lockout on Essential Bus 1A3 (results in a loss of A &amp; C RHR and A Core Spray)</p> <p>Responds to loss of 1A3 Responds to half scram, PCIS Div 1 Groups 1-5 isolations (except MSIVs)</p> <p>ARP actions T.S. 3.0.3, 3.8.7</p>
5B	ED08C	C-BOP C-SRO	<p>Lockout on Essential Bus 1A3 (results in a loss of A &amp; C RHR and A Core Spray)</p> <p>Responds to Auto Diesel START and secures Diesel due to running without cooling water Performs actions to restore Drywell cooling</p> <p>AOP 301</p>
6	MS03C	M- All	<p>Steam leak on main steam line C, in primary containment requires a manual scram</p> <p>IPOI – 5, EOP 1, EOP 2</p>
7	RD020615 RD023435	C - All	<p>Two control rods are stuck out of the core</p> <p>ATWS</p>
8	RH01D	C-BOP C-SRO	<p>"D" RHR Pump trips on overcurrent</p> <p>ED</p>
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>			



### **DAEC 2013 NRC Scenario #3**

The scenario begins at 100% power with the “B” CRD Pump in service. The crew will start the “A” CRD Pump and remove the “B” CRD Pump from service IAW OI 255 – CRD Hydraulic System, Section 6.1

Once the CRD pump swap is completed, a feedwater heater dump valve will fail open resulting in a loss of feedwater heating. The crew will enter the abnormal procedures AOP 646, and AOP 255.2 and take action to lower reactor power. Immediately after the power reduction the “B” Recirc Pump flow controller will slowly fail downscale and the operators will lock up the scoop tube IAW the AOP. The SRO will address Technical Specifications for the speed mismatch.

Then the “A” CRD pump will trip on overcurrent and three CRD accumulators alarm on low pressure. Permission is given to start standby pump IAW OI 255. After the “B” CRD Pump is returned to service the CRD Accumulators remain in alarm on low pressure. The SRO will address Technical Specifications 3.1.5.

After addressing the Technical Specifications for the three inoperable accumulators, Essential Bus 1A3 will trip and lockout requiring entry into AOP AOP-301. The operators will verify the diesel starts but does not tie to the 1A3 bus and that an ESW pump is not running requiring the crew to secure the SBDG to preclude its failure. Before RPS can be recovered the small break LOCA in the drywell will begin and there will be no time for the SRO to address Technical Specifications.

A small leak in the drywell and rising drywell pressure and temperature results in the operators inserting a manual reactor scram. Two of the control rods, which earlier had low accumulator pressures, will remain stuck out of the core following the scram. This will require the crew to terminate and prevent injection prior to the emergency depressurization (**CRITICAL TASK**). As Primary Containment pressures and temperatures rise the “D” RHR Pump will trip on overcurrent shortly after it’s started. Without RHR the drywell temperature will rise above 280°F and the crew must emergency depressurize (**CRITICAL TASK**). Additionally when reactor water level is restored following the emergency depressurization the crew must maintain reactor pressure below the Minimum Steam Cooling Pressure (MSCP) (**CRITICAL TASK**).

The scenario may be terminated after the emergency depressurization is performed, RPV level is restored and reactor pressure is below the MSCP.