Facility: Seabrook		Scenario No. A Rev. 1		Op-Test No. 1	
Examiners:	David Silk Larry Briggs Todd Fish		Operators:	US: U 1 / U 5 PSO: U 2 / U 6 BOP: U 4 / U 8	

Objectives: The crew will respond to load reduction order from ISO New England. During the scenario the crew will respond to a Power Range NIS failure, and failure of a MFP recirculation valve. A security breech / sabotage results in Loss of All AC Power that degrades when a reactor coolant pump seal fails.

Initial Conditions: 100% power, MOL. The main turbine will fail to trip automatically. Diesel Generator DG-1B will fail to start automatically. The C SG has a 0.5 gpd (0.00034 gpm) tube leak to serve as a Red Herring.

Turnover: 100% power, MOL conditions. Chemistry has determined that the C SG tube leak is 0.5 gpd. Abnormal procedure OS1227.02, Steam Generator Tube Leak, was entered when RM-6505 increased from 46 cpm to about 60 cpm. A very slight increase was also noted on RM-6512, C SG blowdown. The abnormal was exited at step 6b. When Chemistry has updated the RM-6505 correlation, perform the brief required by Attachment A of OS1227.02.

Event No.	Malf. No.	Event Type*	Event Description
1.	FW012F	C (US)	As soon as the crew has assumed the watch, the recirculation valve for main feed pump (MFP) FW-P-32A will fail open. The increase in feed pump flow causes MFP suction pressure to decrease and the standby condensate pump starts. Thermal power increases due to the reduced feed temperature. • The crew must reduce turbine load to hold power to the license limit. • OS1290.02, RESPONSE TO CONDENSATE OR FEEDWATER SYSTEM TRANSIENT, may be used as a guide. • When the crew diagnoses the failure they will direct an NSO to manually close or isolate the valve.
2.		N (US)	ISO New England orders unit back down to 90% within 15 minutes / ASAP for grid stability. At the Chief Examiner's (CE) discretion, continue to next event.
3.	NI002	I (US)	Channel N42, power range NIS fails high. If in automatic, control rods will insert responding to the failed channel. • The crew will confirm rod control is responding to a failed instrument and place rod control in MANUAL. • Abnormal OS1211.04, POWER RANGE NI INSTRUMENT FAILURE, will be used to respond to the failure.

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

Event No.	Malf. No.	Event Type*	Event Description
3.	DEDE097 ED002 RPS003	M (US)	The major event is initiated by a security event. Unauthorized operation of plant equipment results in loss of 125VDC vital bus 11A. Loss of the vital bus results in a reactor trip due to, among others, loss of feed water flow to all SGs. • The crew will respond to the reactor trip, performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. The main turbine fails to automatically trip. The BOP must manually trip the turbine to prevent excessive cooldown (CCT). Loss of the vital bus also results in loss of control power to TRN A components including DG-1A. The diesel will not start unless an air start valve is manually overridden.
	SY001	M (US)	Shortly after the turbine generator breaker opens, a loss of Off-Site power will occur. With DG-1B automatic start defeated as part of the scenario setup, a loss of all AC occurs as soon as Off-Site power is lost. Additionally, with no power available on bus E5 and loss of the DC bus, vital AC instrument panels 1A and 1E are lost. • At step 3 of E-0, the crew will transition to ECA-0.0, LOSS OF ALL AC POWER.
			At step 5 of ECA-0.0 the crew will be informed of the security breech and advised that the vital DC bus may be re-energized (CCT).
			At step 5c RNO of ECA-0.0 the crew will direct local starting of DG-1B and power will be restored to bus E6 (CCT).
			At step 5g RNO the crew may restore power to bus E5 by re-energizing vital DC bus 11A. DG-1A will start automatically and restore power to bus E5 (CCT).
	RC016 RC017 RC018	M (US)	Five minutes after the loss of Off-Site power one of the reactor coolant pumps seals will fail due to loss of cooling. The seal failure results in loss of RCS inventory. RCS pressure decreases and an automatic Safety Injection will be actuated (TRN B only, if power has not been restored to TRN A vital AC instrument panel 1A).
4.		M (US)	• The crew will exit ECA-0.0 and return to E-0, step 3b and continue to step 4 and begin monitoring CSFs for implementation. • The crew will proceed through E-0 to step 20 and exit to E-1, LOSS OF REACTOR OR SECONDARY COOLANT. Terminate the exam at CE discretion. EOP sequence: E-0 ⇒ ECA-0.0 ⇒ E-0 ⇒ E-1

CCT(s) 1. MANUALLY trip the main turbine or close the MSIVs before a severe (ORANGE PATH) challenge develops to either the Subcriticality or the Integrity CSF or before transition to ECA-2.1, which ever happens first.
2. ENERGIZE at least one AC emergency Bus before placing safeguards equipment in the pull to lock position.

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

North Atlantic

NRC LICENSE EXAMINATION

SIMULATOR DEMONSTRATIVE EXAMINATION

SCENARIO A

PREPARED BY: _____ **DATE:** 1/17/00
INSTRUCTOR

REVIEWED BY: _____ **DATE:** _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ **DATE:** 1/20/00
OPERATIONS TRAINING SUPERVISOR

SCENARIO DESCRIPTION / OBJECTIVES:

The objective of this simulator examination is to assess individual operator performance as well as crew performance and communication skills.

The crew will respond to load reduction order from ISO New England. During the scenario the crew will respond to a Power Range NIS failure, and failure of a MFP recirculation valve. A security breech / sabotage results in Loss of All AC Power that degrades when a reactor coolant pump seal fails.

SIMULATOR SETUP	
___**RESET** the simulator to 100%, MOL. INITIATE a 0.5 gpd steam generator tube leak on SG C: ___**IMF SG001 0.00034 0 0<CR>** DEFEAT the main turbine automatic trip: ___**IMF RPS003<CR>** DEFEAT automatic start of DG-1B: ___**IOR DIDGCS95221 STOP<CR>** ___**IOR DIDGCS95222 STOP<CR>** Setup Trigger E1 to initiate the Major Event: ___**IMF DEDE097 (E1)<CR>** (D6054, Batt Chgr 1A Output Bkr Open) ___**IMF ED002 (E1 15)<CR>** (Loss of 125 VDC Bus 11A) ___**IMF DEDE098 (E1 15)<CR** (D6055, Batt 1A Output Bkr to Bus 11A Open) Setup Trigger **E2** to initiate loss of all AC after the main generator breaker opens: • GO to Trigger Directory • SELECT: file **GENBKRTRIP** (LOEDCS98761[3] .EQ. 1) • SELECT: **Assign Trigger File** ___TYPE: **E2<CR>** Link the following to trigger E2: ___**IMF SY001 (E2 10)<CR>** (TOTAL LOSS OF OFFSITE POWER) ___**IMF RC016 (E2 300) 1.0 0 0<CR>** (RCP-1D #1 SEAL FAILURE) ___**IMF RC017 (E2 300) 1.0 0 0<CR>** (RCP-1D #2 SEAL FAILURE) ___**IMF RC018 (E2 300) 300 0 0<CR>** (RCS LEAK)	

TURNOVER	
100% power, MOL conditions. Chemistry has determined that the C SG tube leak is 0.5 gpd. Abnormal procedure OS1227.02, Steam Generator Tube Leak, was entered when RM-6505 increased from 46 cpm to about 60 cpm. A very slight increase was also noted on RM-6512, C SG blowdown. The abnormal was exited at step 6b. When Chemistry has updated the RM-6505 correlation, perform the brief required by Attachment A of OS1227.02. No equipment out of service.	

SCENARIO OUTLINE	
Provide the turnover sheet to the US. Allow the crew to walk-down the MCB. When directed by the Chief Examiner (CE), initiate EVENT 1.	The US should brief the crew on the status of the plant and actions taken in OS1227.02, STEAM GENERATOR TUBE LEAK.
EVENT 1 (Component –US) Fail open FW-P-32B recirculation valve: **IMF FW012F<CR>** (MFP-32B RECIRC VALVE FAILS OPEN) *CUE: When NSO is directed to check the status of FW-V4065, report that the valve is full open.* *When the NSO is directed to close / isolate the valve, use remote function FW009 (FW-V15) to isolate the valve.* **RFI FW<CR>** **SELECT FW009, set to 0.0 (use delay feature to ramp the valve closed).** When the crew has completed OS1290.02, or as directed by the CE, continue to EVENT 2.	*The increase in feed pump flow causes MFP suction pressure to decrease and the standby condensate pump starts. Thermal power increases due to the reduced feed temperature.* *Crew should note thermal power increase and automatic start of the standby condensate pump. Further investigation should reveal that feed pump suction flow is high on both pumps.* OS1290.02, RESPONSE TO CONDENSATE OR FEEDWATER SYSTEM TRANSIENT, entered based on standby condensate pump starting automatically: The crew must reduce turbine load to hold power to the license limit. • US directs BOP to reduce power as necessary. • BOP reduces turbine load Step 4 RNO of OS1290.02 directs crew to check the feed pump recirculation valve for proper operation. When the crew diagnoses the failure they will direct an NSO to manually close or isolate the valve. Step 5 directs crew to check whether the standby condensate is running. • US directs BOP to adjust the long-term recirculation valve for 18,000 gpm. • BOP sets CO-FK-4042 for 18,000 gpm. As the NSO closes FW-V15 feed pump flow will return to normal. The crew will use OS1290.02 to restore normal plant configuration.

EVENT 2 (Normal – US) *CUE: Call the control room as ISO New England and direct crew to reduce unit output to 90% as soon as possible (w/i 15 minutes).* Continue to EVENT 3, as directed by the CE	The crew should use Figure 6: Rapid Power Decrease Guidelines, of OS1000.06, POWER DECREASE. • US briefs crew on control band for temperature and directs PSO to calculate required boration. Informs SM and makes plant announcement. • PSO calculates boration and requests peer check. Begins boration. • BOP begins load reduction, within limitations set by US.
EVENT 3 (Instrument – US) Initiate failure of power range NIS channel N42: **IMF NI002<CR>** (N42 Power Range Fails High) To indicate Cabinet CP-2 door opening insert D-Point; DVS, DMM: DMM006, D5630, PROTECTION CAB CP-2 DOOR OPEN. **IMF DMM006** <CR> To trip bistables; RFI,BIS: **BIS014 [RC-TB-421C] OTΔT Trip** **BIS018 [RC-TB-421G] OPΔT Trip** Delete DMM006, for closing CP-2 Door. **DMF DMM006<CR>** After the crew has completed OS1211.04, or as directed by the CE, continue to EVENT 4.	The control rods will automatically insert in response to the failed NI channel. The crew will enter OS1211.4, POWER RANGE NI INSTRUMENT FAILURE. • Crew determines automatic rod insertion is NOT due to Runback / Setback. • US directs actions per procedure. • PSO places rod control in MANUAL, as applicable. • PSO identifies affected NIS channel. • BOP controls Tavg using turbine load as directed. • PSO bypasses affected channel as directed. • Crew verifies NO redundant bistables tripped and removes control power fuses. • US performs brief and coordinates with I&C to trip bistables. • PSO verifies proper P-10 status. • Crew refers to Technical Specifications (TS) and deletes applicable computer points from scan. • PSO returns Rod Control to AUTO, as applicable. • US informs SM of failure.
EVENT 4 (Major – US) The major event is initiated as a security breech - sabotage. The crew will be notified of the sabotage by an NSO later.	

Initiate the major event by selecting Event Trigger **E1**: **SELECT Initiate Pending Events** ***NOTE:*** *Unauthorized operation of plant equipment results in loss of 125VDC vital bus 11A. Loss of the vital bus results in a reactor trip due to, among others, loss of feed water flow to all SGs. Loss of the vital bus also results in loss of control power to TRN A components including DG-1A. The diesel will not start unless an air start valve is manually overridden.* *After the main generator breaker opens, loss of Off-Site power will occur. With DG-1B automatic and manual start defeated as part of the scenario setup, loss of all AC occurs as soon as Off-Site power is lost. With no power available on bus E5 and loss of the DC bus, vital AC instrument panels 1A and 1E are lost.* ***CUE:*** *After the I/As of ECA-0.0 have been completed, call the control room as an NSO with security personnel.* ***Report*** *that an apparent terrorist posing as a visitor on tour broke away from the tour long enough to open the battery charger breaker and battery breaker. NSO is prepared to restore power to the battery bus as directed. Terrorist in custody.* ***NOTE:*** ***Restore power as directed by the crew. They may pursue either emergency bus.*** ***CUE:*** *NSO at DG-1B sees no apparent cause for DG-1B failure to start.* ***CUE:*** *When directed by the control room to attempt local start of DG-1B, perform the following to simulate placing the DG control selector switch in LOCAL:* **CAE! dgblocal <CR>** ***CUE:*** *Report that DG-1B is in LOCAL (unless directed to start and load without reporting).*	The crew will respond to the event using E-0, REACTOR TRIP OR SAFETY INJECTION. • US directs board operators to perform immediate actions (I/A). • PSO performs I/As. • BOP performs I/As. ⇒ MANUALLY trips the main turbine **(CCT)**. ⇒ Attempts to restore power to BOTH emergency busses. The crew diagnoses Loss of All AC and transitions to ECA-0.0, LOSS OF ALL AC POWER. • US directs board operators to perform immediate actions. • PSO performs I/As. • BOP performs I/As. • US directs operator actions in ECA-0.0. During the performance of ECA-0.0, the crew may, as applicable take a procedure deviation to close the MSIVs when main condenser vacuum is lost. (Basis for deviation is to protect plant equipment). • US directs BOP to initiate MSI or close the MSIVs. • US directs PSO to initiate MSI At step 5 of ECA-0.0, the crew will attempt restoration of power to at least one emergency bus. • US directs BOP to attempt start of DG B from the MCB. • US/BOP directs the NSO at DG 1B to start DG 1B locally (CCT).

CUE: Perform the following to simulate LOCAL start of DG-1B: • **Delete the IOR on <u>both</u> emergency STOP Pushbuttons.** • **IOR the DG-1B RESET Control switch to RESET and then delete the IOR.** • **IOR the Emergency Start Pushbutton to START.** *CUE: Report that DG-1B has started (unless directed to start and load without reporting).* *CUE: Perform the following to close the breaker:* • **Delete the IOR on the DG-1B breaker control switch.** ***NOTE: If bus E5 is not restored within 13.5 minutes, the MPCS and RDMS should be halted:*** ***IMF SCS001<CR>*** ***IMF RM111<CR>*** ***NOTE: Restoration of power to DC bus 11A per operating procedure requires using the battery charger. As the battery charger is not available, if the crew chooses to restore bus 11A, they will have to take a procedure deviation to restore power by closing the battery breaker.*** *CUE: When directed to re-energize bus 11A:* ***DELETE malfs ED002 and DEDE098.*** ***NOTE: When power is restored to the DC bus, vital AC inverters PP-1A and 1E will be re-energized. The ASDVs for SG A and C will be in MANUAL when power is restored (instead of AUTOMATIC). As a result the A and C ASDVs will not control SG pressure automatically and a safety may lift.*** *Dependent upon timing, the RCP seal failures may be in progress. If so, inventory loss to the RCS will result in on automatic SI when RCS pressure decreases to the SI setpoint.*	The crew recognizes restoration of power to bus E6 and verifies proper EPS sequencing. At step 5g RNO, the crew can restore power to bus E5 by restoring power to DC bus 11A. • After checking for procedural guidance, the crew should evaluate whether a procedure deviation is warranted. • If warranted, the US directs that bus 11A be re-energized from the **battery (CCT if E6 is not restored)**. When bus 11A is restored DG-1A will start automatically and re-energize bus E5. Vital instrument busses 1A and 1E will be restored. The crew may continue processing through ECA-0.0 while attempting to restore power to bus E5. With at least one emergency bus energized the crew will exit ECA-0.0 at step 5h and go to step 3 of E-0. At step 4 of E-0, the crew will check whether SI is actuated. **IF** SI is not actuated and NOT yet required, the crew will exit E-0 and go to ES-0.1, REACTOR TRIP RESPONSE until SI is required. **IF** SI is actuated the crew will continue to process through E-0. The crew will process through E-0 based on power available.

Upon CE discretion, terminate the exam when the crew exits E-0 to E-1.	At step 20 of E-0 the crew should exit E-0 and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
CCTs: 1. MANUALLY trip the main turbine or close the MSIVs before a severe (ORANGE PATH) challenge develops to either the Subcriticality or the Integrity CSF or before transition to ECA-2.1, which ever happens first. 2. ENERGIZE at least one AC emergency Bus before placing safeguards equipment in the pull to lock position. **EAL Classification: ALERT 6c or 15c or 18b.**	

Appendix D | Scenario Outline | Form ES-D-1

Facility: Seabrook		Scenario No. I Rev. 3		Op-Test No. 1	
Examiners:	David Silk Larry Briggs Todd Fish	Operators:	US: PSO: BOP:	U 2 / U 6 U 3 / U 7 U 1 / U 5	

Objectives: A reactor coolant loop narrow range temperature channel will fail. The crew will be required to reduce power to ≤ 98% power prior to tripping bistables due to the Upper Plenum Anomaly phenomena. Upon completion of tripping bistables, failure of the TRN A SW pump service will occur. The standby ocean SW pump will not start and the crew will initiate a TOWER ACTUATION for TRN A. A spurious turbine trip will occur but the TG breaker will not open. Loss of load will cause a main steam bottle rupture. All MSIVs will fail open. The crew will respond to an uncontrolled depressurization of all SGs.

Initial Conditions: 100% power. The main generator breaker will fail to open on trip demand. Automatic transfer to the Reserve Auxiliary Transformer (RAT) will not occur for 13.8kV busses 1 and 2 and 4.16kV emergency bus E5. The A DG will not start automatically.

Turnover: 100% power.

Event No.	Malf. No.	Event Type*	Event Description
1.	RC008	I (US)	The Tavg / ΔT channel for RCS Loop 1 will fail causing the automatic rod control system to insert control rods. • The crew will respond using OS1201.08, TAVG/DELTA T INSTRUMENT FAILURE.
2.		N (US)	The crew will reduce power from 100% to ≤ 98% power to allow tripping of the bistables for Event No. 1.
3.	I/O SW	C (US)	The TRN A SW pump will trip on OC. The standby pump will fail to start automatically or manually. The crew will place TRN A SW on the Cooling Tower. • The crew will respond using OS1216.01, DEGRADED ULTIMATE HEAT SINK.
4.	ED047 ED003 MSIVs FO MS039	M (US)	Spurious trip of the main turbine will initiate the major event. When the turbine trips the output breaker will fail to open. A BREAKER FAILURE scheme will be actuated to isolate the TG from the Grid. Automatic transfer to the RAT for busses 1, 2, E5 will not occur. The reactor will trip on turbine trip. The A emergency DG will not automatically start.

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

Event No.	Malf. No.	Event Type*	Event Description
			• The crew will respond to the reactor trip by performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • The BOP will perform an emergency start of the A DG. • At step 18 the crew will exit E-0 and go to E-2, FAULTED STEAM GENERATOR ISOLATION. • At step 2 of E-2 the crew will go to ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS.
			At step 2 of ECA-2.1 the crew should minimize feed flow to all SGs but ~ 25 gpm should be established and maintained.
			• The crew will establish ~ 25 gpm feed flow to all SGs (CCT).
			The crew will continue to process ECA-2.1 until at least one MSIV is closed locally. The crew will return to E-2 step 1 when at least one SG pressure increases after the MSIV is closed. Terminate the exam (at CE discretion) when the crew has entered E-1.
			EOP sequence; E-0 ⇒ E-2 ⇒ ECA-2.1 ⇒ E-2 ⇒ E-1

CCT 1. Control the EFW flow rate to not less than 25 gpm per SG in order to minimize the RCS cooldown rate before a severe challenge develops to the Integrity CSF

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

North Atlantic

NRC LICENSE EXAMINATION

SIMULATOR DEMONSTRATIVE EXAMINATION

SCENARIO I

PREPARED BY: _____ **DATE:** 1/17/00
INSTRUCTOR

REVIEWED BY: _____ **DATE:** _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ **DATE:** 1/20/00
OPERATIONS TRAINING SUPERVISOR

SCENARIO DESCRIPTION / OBJECTIVES:

The objective of this simulator examination is to assess individual operator performance as well as crew performance and communication skills.

A reactor coolant loop narrow range temperature channel will fail. The crew will be required to reduce power to $\leq$ 98% power prior to tripping bistables due to the Upper Plenum Anomaly phenomena. Upon completion of tripping bistables, failure of the TRN A SW pump will occur. The standby ocean SW pump will not start and the crew will initiate a TOWER ACTUATION for TRN A. A spurious turbine trip will occur but the TG breaker will not open. Loss of load will cause a rupture of the main steam header. All MSIVs will fail open. The crew will respond to an uncontrolled depressurization of all SGs.

SIMULATOR SETUP	
__ Reset the simulator to 100%, MOL Insert malfunction ED047, TG BKR FAILURE TO AUTO TRIP. __ **IMF ED047<CR>** Insert an I/O override to prevent manually opening the TG BKR. __ **IOR DIEDCS98761 NA-CLOSE<CR>** Insert an I/O override on each of the RAT breakers for Busses 1, 2 and 5 to defeat auto transfer from the UAT to the RAT. __ **IOR DIEDCS98501 TRIP<CR>** __ **IOR DIEDCS98601 TRIP<CR>** __ **IOR DIEDECS97071 TRIP<CR>** Insert an I/O override to prevent SW-P-41C from automatically (or Manually) starting when SW-P-41A trips on over-current. __ **IOR DISWCS61021 STOP<CR>** Setup Event Trigger **E1** to initiate the major event when the breaker failure scheme is actuated: • GO to Trigger Directory • SELECT: file **BKRFAILURE** (LOSYCS9992-2 .EQ. 1) • SELECT: Assign Trigger File __ Type: **E1<CR>** Link the following 6 commands to trigger E1: __ **IMF MS039 (E1) 0.20 15 0<CR>** (Main Steam Header Steam leak) __ **IOR LOEDCS98761[2] (E1) OFF<CR>** (CLOSED Lamp for TG BKR CKT #1) __ **IOR LOEDCS98761[4] (E1) OFF<CR>** (CLOSED Lamp for TG BKR CKT #2) __ **IOR LOEHCUC3851[13] OFF** (Generator BKR CLOSED lamp on EHC panel)	

Insert malfunction ED003, A EDG FAILS TO AUTO START: **___IMF ED003<CR>** Insert malfunctions to fail open ALL MSIVs: **___IMF MS022A<CR>** **___IMF MSO22B<CR>** **___IMF MS022C<CR>** **___IMF MS022D<CR>**	
TURNOVER	
100% power. No equipment out of service	

SCENARIO OUTLINE	
Provide the turnover sheet to the US. Allow the crew to walk-down the MCB. When directed by the Chief Examiner (CE), initiate EVENT 1.	
EVENT 1 (Instrument – US) Insert malfunction RC008, RCS NARROW RANGE Tc FAILS HIGH: **IMF RC008<CR>**	The Tavg / ΔT channel for RCS Loop 1 will fail causing the automatic rod control system to insert control rods. The crew will respond using OS1201.08, TAVG/DELTA T INSTRUMENT FAILURE. • PSO responds to VAS alarms, checks MCB indication and determines that LP1 Tavg/ΔT has failed causing auctioneered Tavg to be high. • US directs PSO to place rods in MANUAL. • US directs BOP to ensure Steam Dumps are closed. • US directs PSO to DEFEAT affected Tavg and ΔT channel. • PSO defeats affected channel as directed. Crew restores control systems to automatic as appropriate. Discussion should include returning rods to Full Out Position (FOP) and ΔI control. • PSO returns rod control to automatic as directed by the US. • PSO returns PZR level control to auto, as applicable. • Crew verifies NO redundant bistables tripped. • Crew refers to TS. • US performs brief, including the requirement to refer to RE-24 for power restrictions for tripping bistables and coordinates with I&C to trip bistables. • US informs SM of failure.
EVENT 2 (Normal – US)	The crew will reduce power from 100% to ≤ 98% power to allow tripping of the bistables for Event No. 1. The crew should use OS1000.06, POWER

At the discretion of the CE, when the crew has completed the power reduction to 98%, continue to EVENT 3. **IF** the CE wants to see the crew trip bistables, perform the following as directed by the crew: To indicate Cabinet CP-1 door opening insert D-Point; DVS, DMM: DMM004, D5628, PROTECTION CAB CP-1 DOOR OPEN. **IMF DMM004 <CR>** To trip bistables; RFI,BIS: **BIS013 [RC-TB-411C] OTΔT Trip** **BIS017 [RC-TB-411G] OPΔT Trip** **BIS021 [RC-TB-412D] LO-LO Tavg** **BIS037 [RC-TB-412G] LO Tavg FWI** Delete DMM004, for closing CP-1 Door. **DMF DMM004<CR>** As directed by the CE, continue to EVENT 3.	DECREASE, for power reduction. • US establishes a control band for RCS temperature control. • PSO determines the boration requirements • BOP determines an "unloading" schedule. • PSO and BOP coordinate load decrease. When power is $\leq$ 98%, the crew will continue with bistable tripping. • US directs PSO and I&C coordinate tripping of bistables as directed by the US. Crew exits OS1201.08
EVENT 3 (Component – US) Insert malfunction SW001, SW-P-41A OC TRIP: **IMF SW001<CR>** ***NOTE: SW-P-41C does not auto start (will not start manually) due to a failure (simulated) of the R1 relay in the start circuitry.*** *CUE: When TRN A SW is aligned to the CT, delete the I/O override on SW-P-41C to enable the TRN A SW INOP alarm:* **DOR DISWCS61021<CR>**	The crew will respond using OS1216.01, DEGRADED ULTIMATE HEAT SINK. • US directs operator actions in OS1216.01 • BOP manually initiates Tower Actuation (TA) for TRN A SW and verifies component status. The crew refers to ATTACHMENT A to determine whether CT spray and/ or fans are required. • US notifies Security that the CT is in service. • US notifies Chemistry to sample the CT basin for NPDES permit. In step 4 the crew aligns TRN A CT pump for auto start capability: • BOP places TRN A SW pump switches in PTL. • BOP places the TRN A CT pump

At CE discretion, continue to EVENT 4 when the crew has completed OS1216.01.	control switch in NAS. • BOP resets TRN A TA signal The crew refers to TSs and notifies the SM.
EVENT 4 (Major- US) ***NOTE: Spurious trip of the main turbine will initiate the major event. When the turbine trips the output breaker will fail to open. A BREAKER FAILURE scheme will be actuated to isolate the TG from the Grid. Automatic transfer to the RAT for Busses 1, 2 and E5 will not occur. The reactor will trip on turbine trip. The A emergency DG will not automatically start.*** Initiate the major event by inserting an I/O override to trip the main turbine: **IOR DIEHCUC3851TVT TRIP<CR>** (Main Turbine Trip Pushbutton on MCB-FF) **NOTE: If the crew dispatches NSOs to locally close the MSIVs, do not close them until ECA-2.1 step 2 has been completed.** ***NOTE: Automatic isolation of EFW to one SG will occur due to high flow caused by lower than normal pressure on SGs.***	The crew will respond to the reactor trip by performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • The US will direct operator actions in E-0. • The BOP will attempt to manually trip the TG Breaker when load decreases to zero. • The BOP will perform an emergency start of DG-1A. At step 4 of E-0, automatic SI will have occurred (or will occur shortly). If the crew performs a MANUAL MSI based on decreasing SG pressures, the MSIVs will not close. At step 7, as applicable, the crew should determine that the affected SG is faulted and leave EFW isolated. • The BOP should note that EFW is isolated to one SG. At step 9 the crew will verify that SW is being supplied by CT on TRN A and ocean on TRN B. • BOP verifies CT pump operating for TRN A. Ocean pump for TRN B. At step 11, if not already attempted, the crew will attempt to close the MSIVs. • BOP initiates a MSI • PSO initiates MSI • BOP attempts closing MSIVs using the normal close switches.

NOTE: At step 2 of ECA-2.1 the crew should minimize feed flow to all SGs but ~ 25 gpm should be established and maintained. ***NOTE: After the crew has completed step 2 of ECA-2.1, the NSOs may begin closing MSIVs as directed. The C SG MSIV will not close*** **DMF MS022A<CR>** **DMF MS022B<CR>** **DMF MS022D<CR>** Upon CE discretion, terminate the exam when the crew has entered E-1 from E-2.	At step 18 the crew will exit E-0 and go to E-2, FAULTED STEAM GENERATOR ISOLATION. At step 2 of E-2 the crew will go to ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS. • US directs operator actions. • BOP isolates steam flow to the TDEFW pump. • The BOP will establish ~ 25 gpm feed flow to all SGs as directed by the US (CCT). The crew will note that SG pressures begin to recover when the MSIVs are closed and return to E-2, step 1.
CCT: 1. Control the EFW flow rate to not less than 25 gpm per SG in order to minimize the RCS cooldown rate before a severe challenge develops to the Integrity CSF **EAL CLASSIFICATION: UE 15b**	

Facility: Seabrook		Scenario No. G Rev. 3		Op-Test No. 2	
Examiners:	David Silk		Operators:	US:	U 3 / U 7
	Larry Briggs			PSO:	U 1 / U 5
	Todd Fish			BOP:	I 1 / I 2

Objectives: The crew will perform a Quarterly surveillance on the Feedwater Isolation Valves. While at 100% power, the crew will respond to a failure of the controlling pressurizer pressure channel and loss of the in-service centrifugal charging pump. The shaft will shear on main feed pump FW-P-32B. SG LO-LO level reactor trip demand will be actuated but the reactor will not trip. The crew will be forced to respond to a loss of feedwater induced Anticipated Transient Without Scram (ATWS).

Initial Conditions: 100% power. The reactor will not trip automatically or manually. DG-1B breaker will not close on demand. The turbine driven (TD) EFW pump will trip due to overspeed when steam is supplied to the turbine. When the turbine generator breaker trips, a loss of Off-Site power will occur.

Turnover: The plant is at 100% power. SI-P-6A is OOS for pump bearing inspection. Remaining AOT for SI-P-6A is 140 hours. The quarterly surveillance for the FWI valves needs to be completed ASAP. The ACTIVITY NUMBER is 1-FW-OT033.

Event No.	Malf. No.	Event Type*	Event Description
1.		N (US)	The BOP will be directed to perform the surveillance (no other operations support available). At the Chief Examiner's (CE) discretion continue to the next event. *This surveillance doesn't take long and can be abandoned without consequence to the scenario at any time.*
2.	RC031	I (US)	The controlling channel of pressurizer (PZR) pressure will drift low over 15 minutes from 2235 to 1600 psig. If the crew does not take action, a reactor trip demand will occur on high PZR pressure. • The PSO should be directed (or recommend) that the master pressure controller be controlled in manual to restore PZR pressure to the normal band. • The crew will respond using OS1201.06, PZR PRESSURE INSTRUMENT PT-455/458 FAILURE.
3.	RO027	C (US)	An over-current trip of CS-P-2A will cause the crew to respond to loss of charging. • The crew will respond using OS1202.02, CHARGING SYSTEM FAILURE.
4.	FW007E	M (US)	Main feed pump FW-P-32B shaft shear will initiate the major event. Feed flow will be drastically reduced but no setback occurs because the pump does not trip. SG levels decrease rapidly and a SG LO-LO level reactor trip demand occurs.

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

Event No.	Malf. No.	Event Type*	Event Description
4 cont'd	RPS002 RPS007 SY001 RC014	M (US)	The reactor does not trip. The crew will respond by performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • The PSO will attempt to manually trip the reactor. The reactor does not trip. • The crew goes to FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS. • The PSO performs immediate actions of FR-S.1 (CCT). • The BOP performs immediate actions of FR-S.1 (CCT). • The crew continues with FR-S.1 steps
			Thirty seconds after the main generator breaker opens loss of Off-Site power occurs and the B DG breaker does not close. No means of emergency boration will exist at that point. The motor driven EFW pump is not available because it is powered from bus E6 (B DG). The TDEFW pump trips on overspeed and will not be restored (broke). *The SUFP will be a success path in FR-H.1*
			The crew completes FR-S.1 and goes to the procedure and step in effect. Normally E-0, the crew will go straight to FR-H.1 due the RED path and E-0 having already been exited.
			• At step 1, of FR-H.1, the crew verifies heat sink required. • At step 2 the crew will note that no CCP is available and go directly to step 10 (bleed and feed). • The crew will perform steps 10 through 18, and at step 20 begins to "look" for feed sources to the SGs. • The crew will establish the SUFP as a feed source using step 5 as a guideline and return to step 21 to continue with the procedure. • At steps 24 and 25 the crew will close PORVs and exit to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when subcooling is still less than required.*
			• At step 12 of E-1 the crew goes to ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION.*
			Terminate the exam (at CE discretion) when the crew establishes feed flow.
			EOP sequence; E-0 ⇒ FR-S.1 ⇒ FR-H.1 ⇒ (E-1 ⇒ ES-1.2)*

CCTs 1. INSERT negative reactivity into the core by at least one of the following methods in accordance with FR-S.1:

- Automatic and/or Manual insertion of the RCCAs.
- Establish Emergency Boration flow to the RCS.

2. ISOLATE the main turbine from the SGs before proceeding to step 5 of FR-S.1 on an ATWS initiated by a loss of feedwater.

* Dependent upon status of SGs when feed flow is established.

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

North Atlantic

NRC LICENSE EXAMINATION

SIMULATOR DEMONSTRATIVE EXAMINATION

SCENARIO G

PREPARED BY: Steven Kesinger **DATE:** 1/17/00

INSTRUCTOR

REVIEWED BY: _____ **DATE:** _____

SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ **DATE:** 1/20/00

OPERATIONS TRAINING SUPERVISOR

SCENARIO DESCRIPTION / OBJECTIVES:

The objective of this simulator examination is to assess individual operator performance as well as crew performance and communication skills.

The crew will perform a Quarterly surveillance on the Feedwater Isolation Valves. While at 100% power, the crew will respond to a failure of the controlling pressurizer pressure channel and loss of the in-service centrifugal charging pump. The shaft will shear on main feed pump FW-P-32B. SG LO-LO level reactor trip demand will be actuated but the reactor will not trip. The crew will be forced to respond to a loss of feedwater induced Anticipated Transient Without Scram (ATWS).

SIMULATOR SETUP	
___**RESET** the simulator to 100%, MOL. ___**IMF RPS002<CR>** (AUTOMATIC REACTOR TRIP FAILURE) ___**IMF RPS007<CR>** (MANUAL RX TRIP SWITCHES FAIL TO OPERATE) ___**IMF DEDE333S<CR>** (Suppresses DG-1B INOP alarm) Insert an I/O override to prevent the DG-1B breaker from closing: ___**IOR DIEDECS97101 TRIP<CR>** Setup Event Trigger **E1** to trip the TD EFW pump when MS-V395 begins to open: • GO to Trigger Directory • SELECT: file **395OPEN** (LOMSCS3062-1 .EQ. 1) • SELECT: Assign Trigger File ___Type: **E1<CR>** Link the following to trigger **E1**: ___**IMF MS015A (E1 5)<CR>** Setup Event Trigger **E2** to fail open a pressurizer safety valve when the main turbine trips: • GO to Trigger Directory • SELECT: file **MTTRIP** (LOEHCUC3851-4 .EQ. 1) • SELECT: Assign Trigger File ___Type: **E2<CR>** Link the following to trigger **E2**: ___**IMF RC014 (E2) 1.0 0 0<CR>** Setup Event Trigger **E3** to initiate loss of Off-Site power 30 seconds after the TG Breaker opens: • GO to Trigger Directory • SELECT: file **GENBKRTRIP** (LOEDCS98761-3 .EQ. 1) • SELECT: Assign Trigger File ___Type: **E3<CR>** Link the following to trigger **E3**: ___**IMF SY001 (E3 30)<CR>**	

Setup Event Trigger **E4** to provide indication for CS-P-2A over-current trip: • GO to Trigger Directory • SELECT: file **CCPATRIP** (LOCSCS74241-1 .EQ. 0) • SELECT: Assign Trigger File ___Type: **E4<CR>** Link the following VAS alarm to trigger **E4**: ___**IMF DCS045 (E4)<CR>** (D4652 CNTRFGL CHG PUMP A BKR TRIP & L/O) Link the following remote function to **E4**: • SELECT TRIGS on the top status bar • SELECT Trigger **E4** • SELECT Link Command to Trigger ___Type **MRF RO027 RACKIN**<CR> (Racks in CS-P-2A breaker) **REMOVE** SI-P-6B from service: ___Control Switch in PTL ___Hang Tag ___Press TRN B ECCS BYPASS/INOPERABLE STATUS pushbutton ___**MRF RO020 RACKOUT<CR>**	Red Herring
TURNOVER	
The plant is at 100% power. SI-P-6B is OOS for pump bearing inspection. Remaining AOT for SI-P-6A is 140 hours. The quarterly surveillance for the FWI valves needs to be completed ASAP. The ACTIVITY NUMBER is 1-FW-OT033.	

SCENARIO OUTLINE	
Provide the turnover sheet to the US. Allow the crew to walk-down the MCB.	The US should brief the crew on the status of the plant. The US will perform a pre-evolution briefing for the FWIV surveillance
EVENT 1 (Normal – US) ***NOTE: This surveillance doesn't take long and can be abandoned without consequence to the scenario at any time.*** At the Chief Examiner's (CE) discretion continue to Event 2.	The crew performs the applicable portion of OX1436.07, Main Feedwater System Valve Quarterly, Cold Shutdown Operability Tests And 18 Month Position Verification: • US directs BOP actions • BOP performs activity 1-FW-OT033
EVENT 2 (Instrument – US) Insert malfunction RC031, PZR PRESSURE CHANNEL P455 FAILURE, to cause indicated pressure to drift from 2235 psig to 1600 psig over 15 minutes: **IMF RC031 1600 900 2235<CR>** ***NOTE: If the crew does not take action, a reactor trip demand will occur on high PZR pressure.***	Indications to the crew will include PZR pressure trending down on chart recorder and MPCS trends, pressurizer heaters cycling ON and hardwired annunciator alarms. • PSO responds to VAS alarms, checks MCB indication and determines that a PZR pressure channel has failed. • The PSO should be directed (or recommend) that the master pressure controller be controlled in manual to restore PZR pressure to the normal band. The crew will respond using OS1201.06, PZR PRESSURE INSTRUMENT PT-455/458 FAILURE. • PSO determines that the failed channel is the controlling channel. • US directs the PSO to manually control PZR pressure at program. • PSO manually controls PZR pressure to re-establish normal pressure. • US directs PSO to select an alternate channel for control / backup and recorder as necessary. • US/PSO verify proper operation of the pressure control system. • US directs PSO to realign pressure control system for automatic operation. • US/PSO verify NO redundant bistables are tripped.

EVENT 2 cont'd ***CUE:*** *When directed as I&C, trip the following bistables:* To indicate Cabinet CP-1 door opening insert D-Point; DVS, DMM: DMM004, D5628, PROTECTION CAB CP-1 DOOR OPEN. **IMF DMM004 <CR>** To trip bistables; RFI,BIS: **BIS094 [RC-PB-455A] HI PRESS TRIP** **BIS059 [RC-PB-455B] P-11** **BIS088 [RC-PB-455C] LO PRESS TRIP** **BIS055 [RC-PB-455D] LO PRESS SI** **BIS013 [RC-TB-411C] OTΔT TRIP** Delete DMM004, for closing CP-1 Door. **DMF DMM004<CR>** As directed by the CE, continue to EVENT 3.	The crew verifies TS compliance. • The US conducts briefing with crew and I&C for bistable tripping: • US notifies SM of instrument failure.
EVENT 3 (Component – US) Initiate loss of CS-P-2A (simulated OC trip): **MRF RO027 RACKOUT<CR>** ***NOTE: Trigger E4 will rack in the breaker and insert MPCS D point alarm for CS-P-2A trip &L/O.*** *CUE: IF contacted as Tech Support Engineer, recommend that CS-P-2A be placed in PTL until the pump can be examined.* ***NOTE: IF the crew does not place the pump in PTL, it will start on demand. Prevent auto start as follows:*** ***I/O override the AMBER lamp ON*** ***I/O override the control switch to TRIP.*** As directed by the CE, continue to Event 4.	The crew will respond to the loss of charging using OS1202.02, CHARGING SYSTEM FAILURE. • US directs operator actions • PSO reduces / isolates letdown flow as required. • PSO starts another (CS-P-2B) as directed by the US. • US/PSO checks RCP seal injection greater than 6 gpm per pump. • US/PSO check charging system intact. • PSO restores letdown as directed by US. • PSO restores normal pressurizer level control. • Crew verifies TS compliance. • US notifies SM of charging pump failure. • Crew notifies Tech Support Engineer.

EVENT 4 (Major – US) Initiate the major event by inserting malfunction FW007E, MAIN FEED PUMP B SHAFT SHEAR: **IMF FW007E<CR>** ***NOTE: Feed flow will be drastically reduced but no setback occurs because the pump does not trip. SG levels decrease rapidly and a SG LO-LO level reactor trip demand occurs. The reactor does not trip.*** ***NOTE: (Trigger E2) As soon as the main turbine is tripped, one pressurizer safety will fail open.*** ***NOTE: (Trigger E3) Thirty seconds after the main generator breaker opens loss of Off-Site power occurs and the B DG breaker does not close.*** • ***No means of emergency boration will exist at that point.*** • ***The motor driven EFW pump is not available because it is powered from bus E6 (B DG).*** ***NOTE: (Trigger E1) Five seconds after MS-V395 starts to open, MS-V129 will trip on overspeed. The TD EFW will not be restored. NO EFW flow is available after loss of Off-Site power.*** ***CUE:*** *When directed as an NSO to trip the reactor, wait approximately 30 seconds and then delete malfunction RPS002:* **DMF RPS002<CR>**	The crew will respond by performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • US directs operator actions • The PSO will attempt to manually trip the reactor. The reactor does not trip. The crew goes to FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION / ATWS. • The PSO performs immediate actions of FR-S.1 (CCT). • The BOP performs immediate actions of FR-S.1 (CCT). The crew continues with FR-S.1 steps: The BOP will report that the TD EFW has tripped when the crew checks EFW at step 3. • US / BOP directs NSO to re-establish TD EFW per step 3 RNO. • PSO aligns and starts components for emergency boration to the extent possible with loss of power. • US/Crew dispatches NSO to trip the reactor locally. At step 7 of FR-S.1, as directed by the US, the BOP may initiate actions to establish feed flow using the SUFP from bus 5.

	At step 14 the crew will verify the reactor is subcritical and go to procedure and step in effect. Based on RED path on HEAT SINK, the crew should go directly to FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, step 1.
NOTE: At step1 of FR-H.1, RCS pressure should be ~1400 psig and hot leg temperatures ~620 °F. Heat Sink is required.	At step 1, of FR-H.1, the crew verifies heat sink required.
	At step 2 the crew will note that no CCP is available and go directly to step 10 (bleed and feed).
NOTE: Depending on the timing of feed restoration, the SG wide range levels may decrease below the HOT DRY (adverse CNTMT) level setpoint of 30%. This will significantly increase the time to transition out of FR-H.1	At step 11 the crew initiates SI (only TRN A emergency bus has power). • At step 13 PSO opens BOTH PZR PORVs as directed by US. • At step 20 the crew begins to "look" for feed sources to the SGs.
CUE: When directed to transfer the SUFP power from Bus 4 to Bus E5 perform the following: **Ensure that the MCB switches are in PTL** Rack out the Bus 4 breaker: **MRF RO047 RACKOUT<CR>** Switch control power to bus E5: **MRF FW042 BUS-E5<CR>** Rack in the Bus E5 breaker: **MRF RO161 RACKIN<CR>**	The crew will establish the SUFP as a feed source using step 5 as a guideline and return to step 21 to continue with the procedure. • As directed by the US, the BOP will coordinate switching of the SUFP to bus E5. • The BOP must reset TRN A RMO prior to placing the Bus 5 control switch in AUTO to make the SUFP available.
	Dependent the status of the SGs (Hot Dry or not) the crew will establish feed flow. • At steps 24 and 25 the crew will close PORVs and exit to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when subcooling is still less than required due to open safety. • At step 12 of E-1 the crew transitions to ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION.
At the discretion of the CE, terminate the exam after the crew has established feed flow.	

CCTs: 1. INSERT negative reactivity into the core by at least one of the following methods in accordance with FR-S.1: • Automatic and/or Manual insertion of the RCCAs. • Establish Emergency Boration flow to the RCS. 2. ISOLATE the main turbine from the SGs before proceeding to step 5 of FR-S.1 on an ATWS initiated by a loss of feedwater. **EAL CLASSIFFICATION: SAE based on H-red (with Hot Dry SG criteria); ALERT based on Heat Sink restored on 15c OR C yellow with Z yellow.**	

Facility: Seabrook		Scenario No. H Rev. 2		Op-Test No. 2	
Examiners:	David Silk Larry Briggs Todd Fish		Operators:	US: I 1 / I 2 PSO: U 4 / U 8 BOP: U 2 / U 6	

Objectives: The crew will continue a plant shutdown. During the shutdown the crew will respond to a failed SG steam flow channel and loss of primary component cooling. The main steam isolation valve (MSIV) for the B SG will inadvertently close. When the MSIV closes one safety valve on the B SG will stick open. The transient on the SG will cause a tube rupture in the faulted SG. The crew will be forced to respond to a faulted / ruptured SG.

Initial Conditions: 75% power. The standby component cooling pump in TRN B will fail to start automatically when the in-service pump trips.

Turnover: Approximately 75% power with abnormal procedure OS1200.03, SEVERE WEATHER CONDITIONS, and OS1000.06, POWER DECREASE, in effect. The National Weather Service reports sustained 100 – 115 mph winds with 130 mph gusts from hurricane Madison. Madison is 5 hours away.

Event No.	Malf. No.	Event Type*	Event Description
1.		N (S)	The crew will continue the power decrease. At the Chief Examiner's (CE) discretion, continue to next event.
2.	MS044	I (US)	The controlling steam flow channel for SG A will fail low. • The crew will respond using OS1235.04, SG FEED FLOW OR STEAM FLOW INSTRUMENT FAILURE.
3.	I/O PCCW	C (US)	The in-service TRN B PCCW pump, CC-P-11B, will trip on over-current. The standby feature of pump CC-P-11D will fail to automatically start the pump. The PSO will start the standby pump. • The crew will respond using OS1212. 01, PCCW SYSTEM MALFUNCTION (CCT).
4.	I/O MSIV I/O CCP	M (US)	Spurious closing of the B SG MSIV will initiate the major event. When the MSIV closes one safety valve on the B SG will fail partially open. As inventory decreases in the B SG a 400 gpm tube rupture will develop. The TRN A centrifugal charging pump, CS-P-2A, will trip shortly after the plant trip. • The crew will respond to the closure of the MSIV by tripping the reactor OR verifying the reactor trip. • The crew will perform the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • At step 8 the crew must ensure that CC-P-11D is running to provide cooling to the TRN B loads. The TRN B CCP is the only HHI pump (CCT).

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

Event No.	Malf. No.	Event Type*	Event Description
4. cont'd		M (US)	• At step 18 the crew will exit E-0 and go to E-2, FAULTED STEAM GENERATOR ISOLATION. • The crew will exit E-2 at step 6 and go to E-3, STEAM GENERATOR TUBE RUPTURE, when they determine that SG B steamline radiation is NOT normal.
			At step 13 of E-3 the crew evaluates whether transition to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED, is appropriate. SG B pressure at this point should be 600 – 700 psig. The transition criteria is ≤ 350 psig. Based on the continued depressurization, the crew may choose to make a procedure deviation and transition to ECA-3.1. If not, they will continue with the cooldown and transition to ECA-3.1 at step 15.
			• IF the crew chooses to continue in E-3 at step 13, they will cooldown using ASDVs to the appropriate RCS temperature in step 14. • At step 15 the B SG pressure will be < 250 psig above the intact SG pressures and the crew will transition to ECA-3.1.
			• At step 11 of ECA-3.1, the crew resumes / continues the RCS cooldown by dumping steam using the ASDVs while maintaining RCS cooldown rate < 100°F/hr. • The crew continues with ECA-3.1 to the SI flow reduction steps.
			Terminate the exam (at CE discretion) after the crew has entered ECA-3.1.
			EOP sequence; E-0 ⇒ E-2 ⇒ E-3 ⇒ ECA-3.1

CCTs 1. MANUALLY start at least one PCCW pump for the available train, to provide adequate component cooling for the operating safeguards train before transition out of E-0.

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

North Atlantic

NRC LICENSE EXAMINATION

SIMULATOR DEMONSTRATIVE EXAMINATION

SCENARIO H

PREPARED BY: Steven Kerzner **DATE:** 1/17/00
INSTRUCTOR

REVIEWED BY: _____ **DATE:** _____
SUBJECT MATTER EXPERT (OPTIONAL)

APPROVED BY: _____ **DATE:** 1/20/00
OPERATIONS TRAINING SUPERVISOR

SCENARIO DESCRIPTION / OBJECTIVES:

The objective of this simulator examination is to assess individual operator performance as well as crew performance and communication skills.

The crew will continue a plant shutdown. During the shutdown the crew will respond to a failed SG steam flow channel and loss of primary component cooling. The main steam isolation valve (MSIV) for the B SG will inadvertently close. When the MSIV closes one safety valve on the B SG will stick open. The transient on the SG will cause a tube rupture in the faulted SG. The crew will be forced to respond to a faulted / ruptured SG.

SIMULATOR SETUP	
___**RESET** the simulator to ~ 75% power, MOL. Setup Event Trigger **E1** to initiate loss of PCCW pump CC-P-11B: ___**IOR DICCCS22401 (E1) STOP<CR>** (CC-P-11B Control Switch to STOP) ___**IOR LOCCCS22401[2] (E1) ON<CR>** (AMBER Lamp for CC-P-11B) ___**IMF DCC044 (E1)<CR>** (D4275 PCCW PUMP B BKR TRIP &L/O) ___**IMF DCC085 (E1)<CR>** (D7491 PCCW PUMP B CS NAS) Setup Event Trigger **E2** to remove the overrides and malfunction DCC085 of trigger E1 when the standby CC pump is started: • GO to Trigger Directory • SELECT: file **DCCSTART** (LOCCCS22411-3 .EQ. 1) • SELECT: Assign Trigger File ___Type: **E2<CR>** Link commands to Trigger **E2**: • SELECT TRIGS on the top status bar • SELECT Trigger **E2** • SELECT Link Command to Trigger ___Type: **DOR DICCCS22401<CR>** Repeat the above sequence for the remaining two commands: ___Type: **DOR LOCCCS22401[2]<CR>** ___Type: **DMF DCC085<CR>** Setup Event Trigger **E3** to trip CS-P-2A: ___**IMF DCS098 (E3)<CR>** (D5841 CNTRFGL CHG PUMP A CS NAS) ___**IOR DICSCS74241 (E3) STOP<CR>** (Pump control switch to stop) ___**IOR LOCSCS74241[2] (E3) ON<CR>** (AMBER mismatch lamp)	The automatic start feature of the standby pump requires the in-service pump control switch to be in NA-START. This trigger will place the in-service (11B) pump control switch in STOP. The automatic start feature will be defeated but the manual start feature will allow the operator to manually start the standby pump.

__ **IMF DCS045 (E3)<CR>** (D4652 CNTRFGL CHG PUMP A BKR TRIP & L/O)	
TURNOVER	
Approximately 75% power with abnormal procedure OS1200.03, SEVERE WEATHER CONDITIONS, and OS1000.06, POWER DECREASE, in effect. The National Weather Service reports sustained 100 – 115 mph winds with 130 mph gusts from hurricane Madison. Madison is currently 5 hours away. OS1200.03 has been completed up through step 13, implementing step 14d with the shutdown in progress.	

SCENARIO OUTLINE	
Provide the turnover sheet to the US. Allow the crew to walk-down the MCB.	The US should brief the crew on the status of the plant and actions taken in OS1200.03, SEVERE WEATHER CONDITIONS. The procedure has been completed up to step 13, implementing step 14d.
EVENT 1 (Normal – US) As directed by the Chief Examiner (CE), continue with Event 2.	The crew should continue with the plant shutdown per the turnover instructions using Figure 6, Rapid Power Decrease Guidelines of OS1000.06, POWER DECREASE. • US establishes a control band for RCS temperature control. • PSO determines the boration requirements • BOP determines an "unloading" schedule. • PSO and BOP coordinate load decrease.
EVENT 2 (Instrument – US) Insert malfunction MS044, MS LINE A STM FLO CHANNEL 1 FAILS LOW: **IMF MS044<CR>** Continue to Event 3, as directed by the CE, when the crew has completed OS1235.04.	The crew will respond using OS1235.04, SG FEED FLOW OR STEAM FLOW INSTRUMENT FAILURE. • BOP identifies affected SG. • BOP controls level manually to restore feed flow. • US directs BOP to maintain 50% - 70% narrow range level. • US directs BOP to select an alternate steam flow channel and return to automatic control. Crew determines that no SG pressure channel has failed and exits procedure. • US performs brief and informs SM of failure. • Crew contacts I&C for troubleshooting and repair.
EVENT 3 (Component – US) Simulate loss of PCCW pump CC-P-11B by Initiating Pending Events of Trigger **E1**:	The crew will be alerted to loss of the PCCW pump by hardwired and MPCS VAS alarms.

• GO to Event Triggers • SELECT **E1** • SELECT **Initiate Pending Events** ***NOTE: The in-service TRN B PCCW pump, CC-P-11B, will trip on over-current. The standby feature of pump CC-P-11D will fail to automatically start the pump. As soon as the PSO starts the standby pump, Trigger E2 will execute.*** Continue to Event 4, as directed by the CE, when the crew has completed OS1212.01.	• The PSO will report loss of CC-P-11B. • The PSO may recommend starting the standby pump prior to entry into the abnormal procedure. • The US may direct or authorize starting of the standby pump prior to entry into the abnormal procedure. The crew will respond using OS1212. 01, PCCW SYSTEM MALFUNCTION. • The US directs operator actions in OS1212.01. • The PSO starts the standby pump as directed. • US/PSO verify PCCW system alignment. • US/BOP verify SW aligned to PCCW. • US/PSO verify PCCW system integrity by checking head tank level stable. • US/PSO verify that Thermal Barrier System is intact. • US/PSO verify proper valve alignment. • US/PSO check for normal system operation, checking temperatures, containment structure cooling units and PCCW TS compliance. The crew notifies SM and Tech Support to initiate trouble shooting of CC-P-11B.
EVENT 4 (Major – US) Initiate the major event by closing the MSIV on the B SG: **IOR DIMSCS3006 CLOSE<CR>** (B SG MSIV control switch) *CUE: When the B SG MSIV is closed / nearly closed, insert malfunction MS030G at 0.9 (90%) severity.* **IMF MS030G 0.9 0 0<CR>** (B SG Safety Valve Fails At Specified Pos)	The BOP, as directed by the US, responds to the closing MSIV by trying to reopen the valve. The crew may dispatch an NSO to the MSIV. When it is obvious that the valve cannot be reopened, or SG level begins to approach the trip setpoint the crew should manually trip the reactor and enter E-0, REACTOR TRIP OR SAFETY INJECTION. • US directs operator actions. • PSO performs I/As. • BOP performs I/As.

CUE: When the reactor is tripped, manually or automatically, Initiate Pending Events of Trigger E3 to cause loss of CS-P-2A. • GO to Event Triggers • SELECT **E3** • SELECT **Initiate Pending Events** *CUE: When the B SG wide range level decreases to ≤ 50%, insert malfunction SG003, SG B TUBE RUPTURE at 400 gpm severity.* **IMF SG003 400 0 0<CR>** ***NOTE: The SGTR on SG B should cause steamline monitors to alarm prior to the crew proceeding past step 6 of E-2. If indications do no develop on the expected timeline, the crew may exit E-2 to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, until indications of the SGTR develop.*** ***NOTE: At step 13 of E-3 the crew evaluates whether transition to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED, is appropriate. SG B pressure at this point should be ~ 300 psig. The transition criteria is ≤ 350 psig. If pressure is > 350 psig, they will continue with the cooldown and transition to ECA-3.1 at step 15.***	If EFW is isolated from B SG when the crew gets to step 7, they should evaluate conditions and determine that EFW should NOT be restored to B SG. At step 8 the crew must ensure that CC-P-11D is running to provide cooling to the TRN B loads. The TRN B CCP is the only HHI pump (**CCT**). • PSO verifies that one PCCW pump is running in each loop. • At step 15 RNO BOP opens the EFW mini-flow valves and throttles EFW, as directed by US, when SG level is adequate. At step 18 the crew will exit E-0 and go to E-2, FAULTED STEAM GENERATOR ISOLATION. • At step 3, BOP identifies SG B as faulted SG. • US/BOP verify that the faulted SG is isolated. • BOP closes MS-V394, as directed, to isolate SG B from the TD EFW pump. The crew will exit E-2 at step 6 and go to E-3, STEAM GENERATOR TUBE RUPTURE when they determine that SG B steamline radiation is NOT normal. The crew should transition to ECA-3.1 with SG pressure < 350 psig. IF pressure is > 350 psig in E-3 at step 13, they will cooldown using ASDVs to the appropriate RCS temperature in step 14. • As directed, the BOP opens the ASDVs for the intact SGs to cooldown at the maximum rate. • BOP increases EFW flow to intact SGs to maintain inventory and aid cooldown. At step 15 the B SG pressure will be < 250 psig above the intact SG pressures and the crew will transition to ECA-3.1. At step 11 of ECA-3.1, the crew resumes / continues the RCS cooldown by dumping

	steam using the ASDVs while maintaining RCS cooldown rate < 100°F/hr.
Terminate the examination, at the discretion of the CE, when the crew has entered ECA-3.1.	At step 17 the crew will determine which RCPs will be shutdown. • As directed, PSO shuts down all but RCP C. At step 18 the crew will recognize that only one CCP is running and they will proceed to step 19. At step 19 the crew must determine whether adequate subcooling and PZR level exists (with one RCP running) to remove SI pumps from service. • US must use correct table to evaluate SI flow reduction criteria. • As directed, the PSO places SI pumps in standby. When both SI pumps are in standby, the crew will continue to step 20.
CCT: 1. MANUALLY start at least one PCCW pump for the available train, to provide adequate component cooling for the operating safeguards train before transition out of E-0. **EAL CLASSIFICATION: ALERT 7b**	

Facility: Seabrook	Scenario No. E Rev. 3		Op-Test No. 3
Examiners: David Silk Larry Briggs Todd Fish		Operators:	US: U 4 / U 8 PSO: I 1 / I 2 BOP: U 3 / U 7

Objectives: The crew will continue with a plant power increase from ~75% power. Shortly after assuming the watch, one main feed pump will trip causing a turbine setback. After stabilizing plant conditions the crew will have to respond to a pressurizer level channel failure that results in loss of letdown. After establishing excess letdown, catastrophic failure of the B RCP results in large break LOCA.

Initial Conditions: ~ 75% power. RH-P-8A will be OOS. RH-P-8B will fail to start automatically on demand. Phase B containment isolation will not occur on either train until manually actuated by the crew.

Turnover: The plant is at ~ 75% power. RH-P-8A is OOS for work on the pump motor bearing. AOT remaining for RH-P-8A is 82 hours. Continue with the power increase using OS1000.05, section 4.4

Event No.	Malf. No.	Event Type*	Event Description
1.		N (US)	The crew will continue with the power increase. At the Chief Examiner's (CE) discretion, continue with next event.
2.	FW038	C (US) R (PSO)	Main feedwater pump FW-P-32A will trip. A main turbine setback to 55% power will be initiated. • The crew will respond using OS1231.03, TURBINE RUNBACK/SETBACK.
3.	RC009	I (US) I (PSO) C (PSO)	Pressurizer (PZR) level channel RC-LT-459 will fail low causing the PZR heaters to trip and loss of letdown. When RC-LCV-459 closes, it will not re-open. • The crew will respond using OS1201.07, PZR LEVEL INSTRUMENT FAILURE. • The crew will establish excess letdown when the PSO reports that RC-LCV-459 will not open.
4.	RC028 RC024	M (US) M (PSO)	Catastrophic failure of the B RCP initiates the major event. An automatic reactor trip / safety injection is actuated. Containment pressure quickly exceeds the Containment Spray / Phase B Isolation setpoint (18 psig). Containment Spray is automatically actuated but Phase B isolation does not occur. RH-P-8B fails to start automatically.

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

Event No.	Malf. No.	Event Type*	Event Description
			• The crew will respond to the reactor trip / SI by performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • At step 7, of E-0, the crew should manually start RH-P-8B. • At step 12 the crew will manually actuate at least one train of containment Phase B Isolation and trip the RCPs, if not already tripped due to loss of subcooling. • At step 13 the crew MUST start at least one RH pump, unless already started (CCT). • At step 20 the crew exits E-0. A RED path on the Integrity CSF and an ORANGE path on the containment CSF will exist. The crew will address the RED first going to FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS. Based on procedure direction, the crew will exit FR-P.1 at step 1 RNO when RCS pressure is less than 260 psig. The crew will go to FR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE. The crew will process through FR-Z.1 and go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
			• The crew will transition from E-1 to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, when the automatic swap-over occurs OR at 115,000 gallons in the RWST, which ever comes first.
			• The crew will align the ECCS system to establish cold leg recirculation per ES-1.3 (CCT).
			EOP sequence; E-0 ⇒ FR-P.1 ⇒ FR-Z.1 ⇒ E-1 ⇒ ES-1.3 ⇒ E-1
			Terminate the exam (at CE discretion) after the crew has completed ES-1.3.

CCTs 1. MANUALLY start at least one low-head ECCS pump (RH-P-8A or 8B) before transition out of E-0.

2. TRANSFER to cold leg recirculation and establish at least one train of ECCS in operation in the recirculation mode.

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

North Atlantic

NRC LICENSE EXAMINATION

SIMULATOR DEMONSTRATIVE EXAMINATION

SCENARIO E

PREPARED BY: _____ **DATE:** 1/17/00

INSTRUCTOR

REVIEWED BY: _____ **DATE:** _____

SUBJECT MATTER EXPERT
(OPTIONAL)

APPROVED BY: _____ **DATE:** 1/20/00

OPERATIONS TRAINING SUPERVISOR

SIMULATOR DEMONSTRATIVE EXAMINATION

SCENARIO DESCRIPTION / OBJECTIVES:

The objective of this simulator examination is to assess individual operator performance as well as crew performance and communication skills.

The crew will continue with a plant power increase from ~75% power. Shortly after assuming the watch, one main feed pump will trip causing a turbine setback. After stabilizing plant conditions the crew will have to respond to a pressurizer level channel failure that results in loss of letdown. After establishing excess letdown, catastrophic failure of the B RCP results in a large break LOCA.

SIMULATOR SETUP	
___**RESET** the simulator to ~ 75% power, MOL.	
REMOVE RH-P-8A from service: ___Control Switch in PTL ___Hang Tag ___Press TRN A ECCS BYPASS/INOPERABLE STATUS pushbutton ___**MRF RO017 RACKOUT<CR>** (RH-P-8A BKR rack out)	RH-P-8A is OOS for work on seal cooler.
REMOVE RH-P-8B from service: ___**MRF RO018 RACKOUT<CR>** (RH-P-8B BKR rack out) ___**IMF DRH018S<CR>** (Suppresses D4959, RHR PUMP B BKR CLOSE INOP SIGNAL) ___**IOR LORHCS24681[3] ON<CR>** (RH-P-8B control switch GREEN lamp)	
Setup Trigger **E1** to allow the operator to manually start RH-P-8B: • SELECT RH-P-8B control switch. • SELECT Event Trigger Popup. • SELECT **NA-STOP** • SELECT **.EQ., setpoint = 0, and assign to trigger E1.** ___**ACCEPT**	When the operator manually starts the pump, the control switch will be moved out of the NA-STOP position to the START position. As soon as the switch is NOT in NA-STOP, the breaker will be racked in and the pump will start.
Link the following to Trigger **E1**: • SELECT TRIGS on the top status bar • SELECT Trigger **E1** • SELECT Link Command to Trigger ___Type: **MRF RO018 RACKIN<CR>** Repeat the above sequence for the remaining two commands: ___Type: **DOR LORHCS24681[3]<CR>** ___Type: **DMF DRH018S<CR>**	

Insert an I/O override that will prevent re-opening RC-LCV-459 during the PZR level channel failure abnormal procedure: ___**IOR DIRCCS459 AUTO<CR>**	
Setup Event Trigger **E12** to initiate RCP-1B failures that will lead to the major event: • SELECT TRIGS on the top status bar • SELECT Trigger **E12** • SELECT Link Command to Trigger ___Type: **MRF RO038 RACKOUT<CR>** (RCP-1B breaker) Repeat the above sequence for the remaining command: ___Type: **IMF RC028<CR>** (RCP-1B Shaft Shear)	The intent of Triggers E12 and E2 are to present indications of catastrophic failure of RCP-1B as the initiating event for LB LOCA. Racking the breaker out and back in will generate the control switch lamp indications consistent with the pump tripping.
Setup Event Trigger **E2** to present indications of RCP-1B failure: • SELECT the RED control switch lamp for RCP-1B. • SELECT Event Trigger Popup. • SELECT **.EQ., setpoint = 0, assign to Trigger E2.** ___**ACCEPT**	
Link the following to Trigger **E2**: • SELECT TRIGS on the top status bar • SELECT Trigger **E2** • SELECT Link Command to Trigger ___Type: **MRF RO038 RACKIN<CR>** Repeat the above sequence for the remaining command: ___Type: **IMF DRC122<CR>** (D4443 RCP B BKR TRIP & LOCK OUT)	

Insert I/O overrides that will prevent automatic initiation of Containment Phase B (P signal) Isolation on both ESF Trains:	
___**IOR DICBSCS2358 RESET<CR>**	Defeats AUTO Phase B Isolation TRN A
___**IOR DICBSCS2359 RESET<CR>**	Defeats AUTO Phase B Isolation TRN A
Setup Event Trigger **E3** to allow the operator to manually initiate TRN B Containment Phase B Isolation: • SELECT either one of the TRN B CBS/P/CVI Actuation switches on MCB BPF09. • SELECT Event Trigger Popup • SELECT **ACTUATE** • SELECT **.EQ., setpoint=1, assign to Trigger E3** ___**ACCEPT<CR>**	
Link the following to Trigger **E3**: • SELECT TRIGS on the top status bar • SELECT Trigger **E3** • SELECT Link Command to Trigger ___Type: **DOR DICBSCS2359<CR>**	
TURNOVER	
The plant is at ~ 75% power. RH-P-8A is OOS for work on the pump motor bearing. AOT remaining for RH-P-8A is 82 hours. Continue with the power increase using OS1000.05, section 4.4.	

SCENARIO OUTLINE	
Provide the turnover sheet to the US. Allow the crew to walk-down the MCB. **EVENT 1 (Normal – US)** The crew should be allowed to increase power to satisfy the requirement for the US to get a Normal evolution. As soon as the Chief Examiner is satisfied that the Normal event has been observed, continue to Event 2.	The US should brief the crew on the status of the plant. The crew should continue with the power increase per the turnover instructions using OS1000.05, POWER INCREASE, step 4.4. • US establishes a control band for RCS temperature control. • PSO determines the dilution requirements • BOP determines a loading schedule. • PSO and BOP coordinate load increase.
EVENT 2 (Reactivity – PSO) **(Component – US)** Initiate a trip of main feed pump FW-P-32A: **IMF FW038<CR>** (A MFP Low Lube Oil Pressure Trip) Continue to Event 3, as directed by CE, when the crew has completed OS1231.03	A main turbine setback to 55% power will be initiated. • The BOP should identify that MFP A has tripped The crew will respond using OS1231.03, TURBINE RUNBACK/SETBACK. • Crew diagnoses setback due to loss of MFP A. • US directs board operators to verify proper control system response: ⇒ Turbine load decreasing ⇒ Rod Control inserting rods ⇒ Steam Dumps open ⇒ SG level control • US directs PSO to perform boration / rapid boration as required by RIL status and AFD control. • Crew monitors RCS temperature and steam dump status. • Crew determines cause of setback to be loss of MFP. • US notifies chemistry, SM and Load Dispatch of transient. • Crew refers to TS for ACTIONs, contacts SM.

EVENT 3 (Instrument – US & PSO) **(Component – PSO)** Initiate failure of the controlling channel of pressurizer level indication by inserting malfunction RC009, PZR LEVEL CHANNEL 1 FAILS LOW: **IMF RC009<CR>** ***NOTE: The control switch for RC-LCV-459 is overridden to AUTO. When the PSO attempts to restore normal letdown the valve will not open. The crew will establish excess letdown.***	Pressurizer (PZR) level channel RC-LT-459 will fail low causing the PZR heaters to trip and loss of letdown. • Based on indication and alarms, the PSO should diagnose the event as a PZR level channel failure. The crew will respond using OS1201.07, PZR LEVEL INSTRUMENT FAILURE. • PSO responds to VAS alarms, checks MCB indication and determines that loss of letdown has been caused by the failed PZR level channel. • PSO determines that the failed channel is the controlling channel. • US directs the PSO to manually control PZR level at program. • PSO reduces charging to minimize PZR level increase. • US directs PSO to select an alternate channel for control and restore PZR heaters. • US/PSO determine that charging flow and pressurizer level are adequate for restoration of normal letdown. When the crew attempts to restore normal letdown, RC-LCV-459 will not open and the crew will establish excess letdown. • US directs establishing excess letdown. • PSO performs manipulations to establish excess letdown. • US directs an operator to remove letdown flow input to the calorimetric by deleting a MPCS point from scan. • PSO aligns pressurizer level control for automatic operation. • Crew verifies NO redundant bistables tripped. • Crew refers to TS.

CUE: *When I&C is directed to trip bistables perform the following:* To indicate Cabinet CP-1 door opening insert D-Point D5628, PROTECTION CAB CP-1 DOOR OPEN: **IMF DMM004<CR>** To trip bistable; RFI,BIS: **BIS098 [RC-LB-459A] PZR LVL HI** Delete DMM004, for closing CP-1 Door. **DMF DMM004<CR>** Continue to Event 4, as directed by the CE, when the crew has completed OS1201.07.	• US performs brief and coordinates with I&C to trip bistables. • US informs SM of failure.
EVENT 4 (Major – US & PSO) Initiate the major event by executing Event Trigger **E12**: • SELECT TRIGS on the top status bar • SELECT Trigger **E12** • SELECT **Initiate Pending Events** As soon as the reactor trips, insert malfunction RC024, RCS COLD LEG LOCA: **IMF RC024<CR>** ***NOTE: IF the crew pursues restoration of RH-P-8A, report that the motor would require 5 hours (minimum) to return to service.***	Catastrophic failure of the B RCP initiates the major event. An automatic reactor trip / safety injection is actuated. Containment pressure quickly exceeds the Containment Spray / Phase B Isolation setpoint (18 psig). Containment Spray is automatically actuated but Phase B isolation does not occur. RH-P-8B fails to start automatically. The crew will respond to the reactor trip / SI by performing the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION. • US directs operator actions. • PSO performs I/As. • BOP performs I/As. At step 7, of E-0, the crew should manually start RH-P-8B. • PSO starts RH-P-8B as directed. At step 12 the crew will manually actuate at least one train of containment Phase B Isolation and trip the RCPs, if not already tripped due to loss of subcooling. • PSO manually initiates Phase B

	Isolation (TRN B). At step 13 the crew MUST start at least one RH pump, unless already started (**CCT**). • PSO starts RH-P-8B as directed. At step 20 the crew exits E-0 and goes to FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS (RED path on P).
NOTE: When the crew transitions out of E-0 there should be a RED path on P (Integrity) due to the large SI flow and an ORANGE path on Z (Containment) due to the containment pressure. ***The crew will transition out of FR-P.1 when they determine that RCS pressure is < 260 psig (no chance for PTS). The crew will go to FR-Z.1 and process through the procedure.***	At step 1 of FR-P.1 the crew determines PTS is not a valid concern at the time. • PSO reports that RCS pressure is < 260psig. • PSO reports that RHR flow (for the running pump) is > 1000 gpm. The crew exits FR-P.1 to procedure and step in effect. With an ORANGE path on Z, the procedure in effect is FR-Z.1, RESPONSE to HIGH CONTAINMENT PRESSURE.
NOTE: Placing the H2 analyzer(s) in service requires manual valve line-up in the field. The TSC should be contacted to dispatch a team from the OSC.	The crew will proceed through FR-Z.1 to step 7. The crew should contact the TSC for placing the H2 analyzer(s) in service. At step 10 of FR-Z.1 the crew will go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT. • At step 3, as directed by US, BOP controls feed flow to SGs based on adverse containment restrictions. • At step 10, as directed by US, PSO RESETS SI. • At step 10, as directed by US, BOP, will stop the emergency diesels and reset for auto start. At step 12 the crew should determine that even though RH-P-8A is not available, the plant is capable of establishing cold leg recirculation. When automatic switchover to RWST occurs OR RWST level decreases to 115,000 gallons, the crew will go to ES-1.3, TRANSFER TO COLD LEG

Terminate the exam (at CE discretion) after the crew has completed ES-1.3. **NOTE: Restore MPCS points deleted from scan.**	RECIRCULATION and realign systems as necessary **(CCT)**. • PSO will simultaneously CLOSE the RWST suction valves CBS-V2 and CBS-V5. • PSO will verify RH-P-8B control switch in NA-START. • PSO will close SI pump mini-flow valves SI-V89, SI-V-90 and SI-V93. • BOP will energize MCC-522 & 622. • PSO will close RH-V14. • PSO will open / verify open CS-V460, CS-V461 and CS-V475. • PSO will open RH-V35 and RH-V36. • PSO will start any pumps stopped due to the RWST empty alarm, as applicable. • PSO will close CBS-V47 and CBS-V51. • PSO will close CS-LCV-112 D & E. • US will direct NSO to de-energize CS-LCV-112D & E. • BOP will de-energize MCC-522 & 622. • US/PSO verify PCCW to CBS heat exchangers. • US/PSO verify PCCW to RHR heat exchangers. • The crew will return to E-1.
CCTs: 1. MANUALLY start at least one low-head ECCS pump (RH-P-8A or 8B) before transition out of E-0. 2. TRANSFER to cold leg recirculation and establish at least one train of ECCS in operation in the recirculation mode. **EAL CLASSIFICATION: SAE based on 15d or possibly P-RED depending on time in scenario.**	

2

JPM

Post Scenario Eal Determinations & Event Classification

SEABROOK STATION

ADMINISTRATIVE PROCEDURE

Classification of Emergencies

ER 1.1

Rev. 28 Chg. 01

SORC Review: NA (Admin. Mod.) Date: NA

Effective Date: 10-01-99

EXPIRATION DATE 07-08-2001

INFORMATION ONLY

Procedure Owner:
D. R. Tailleart

1.0 OBJECTIVES

This procedure specifies the classification of emergencies in accordance with the Seabrook Station Radiological Emergency Plan (SSREP).

2.0 RESPONSIBILITIES

2.1 Unit Supervisor

Responsible for assuming the role of Short Term Emergency Director (STED) until the Shift Manager has reported to the Control Room.

2.2 Shift Manager

Responsible for classifying observed station conditions in accordance with the emergency classification system specified in this procedure and reclassifying the emergency as necessary until relieved by the Site Emergency Director.

2.3 Site Emergency Director

Responsible for analyzing changing station conditions and reclassifying the emergency classification in accordance with this procedure.

3.0 PRECAUTIONS

1. When two or more critical safety functions (CSFs) or emergency conditions exist and different emergency classifications result, the higher emergency classification will be used.

2. Final emergency classifications are contingent upon the evaluation and discretion of the Shift Manager or the Site Emergency Director.

3. Critical safety function evaluation for emergency classification purposes should be performed in accordance with the guidance contained in the Emergency Response Procedures User's Guide of the Operations Management Manual (OPMM).

4. Critical safety function status tree (CSFST) color displays must be sustained indications of continuous conditions. Conditions indicated by CSFST displays must be evaluated and verified before they are used as bases for emergency classifications or for protective action recommendations.

5. Only CSF combinations that require emergency classification are listed on Form ER 1.1A.

6. Emergency Action Levels (EALs) pertaining to specific initiating conditions are described in Figure 1, Miscellaneous Emergency Conditions and Emergency Action Levels.

7. If emergency classification is being considered under any of the High Radiation EALs, which involve a release, (12a, 12b, 12d or 12e), implement offsite dose assessment using procedure ER 5.7, Offsite Dose Projection System (ODPS). A radiological release which requires dose assessment utilizing the Offsite Dose Projection System (ODPS) is defined as follows:

   a. a Wide Range Gas Monitor (WRGM) high alarm (1CC225), or

   b. a Main Steam Line Monitor high alarm with an OPEN atmospheric steam dump valve (ASDV) or safety relief valve (SRV) on the affected line, or

   c. the results of effluent analysis or site boundary monitoring indicate a dose rate greater than or equal to 0.06 mrem/hr.

8. Identify the most severe emergency classification that corresponds to the events circled on form ER 1.1A. Refer to the corresponding Figure 1 initiating condition to complete classification.

9. If an emergency classification is warranted, immediately implement Station Emergency Response Procedure ER 1.2, Emergency Plan Activation.

6.0 REFERENCES

1. Seabrook Station Radiological Emergency Plan
2. ER 1.2, Emergency Plan Activation
3. ER 5.7, Offsite Dose Projection System
4. ECA-1.1, Loss of Emergency Coolant Recirculation
5. ECA-1.2, LOCA Outside of Containment
6. E-1, Loss of Reactor or Secondary Coolant
7. E-2, Faulted Steam Generator Isolation
8. E-3, Steam Generator Tube Rupture
9. ES-0.1, Reactor Trip Response
10. ES-1.1, SI Termination
11. OS1000.11, Post-Trip to Hot Standby

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

6b. Bus E5 AND E6 cannot be powered from the diesels.

NOTE

This Initiating Condition does not apply in Modes 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1.	BOTH INDICATING LIGHTS	
MCB-HF		
UL-19	"A" DIESEL NOT AVAILABLE	
UL-20	"B" DIESEL NOT AVAILABLE	

OR

2.	BOTH VAS ALARMS	
F POINT		
F6587	DG TRAIN A EMERG PWR INOP	
F6637	DG TRAIN B EMERG PWR INOP	

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

6d. Loss of all vital DC Busses 11A, 11B, 11C and 11D.

EMERGENCY ACTION LEVELS

1. ALL THE FOLLOWING VAS ALARMS		
D6094	DC BUS 11A	VOLT LO-LO
D6095	DC BUS 11C	VOLT LO-LO
D6096	DC BUS 11B	VOLT LO-LO
D6097	DC BUS 11D	VOLT LO-LO

OR

2. ALL OF THE FOLLOWING HARDWIRED ALARMS:	
UA-54	DC BUS 11A VOLT LO DC BUS 11C VOLT LO
UA-55	DC BUS 11B VOLT LO DC BUS 11D VOLT LO

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for SITE AREA EMERGENCY

6f. Loss of vital DC Busses 11A, 11B, 11C and 11D for greater than 15 minutes.

NOTE

This Initiating Condition does not apply in Modes 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. ALL OF THE FOLLOWING HARDWIRE ALARMS:

UA-54	DC BUS 11A	VOLT LO
	DC BUS 11C	VOLT LO
UA-55	DC BUS 11B	VOLT LO
	DC BUS 11D	VOLT LO

OR

2. ALL OF THE FOLLOWING VAS ALARMS:

D6094	DC BUS 11A	VOLT LO-LO
D6095	DC BUS 11C	VOLT LO-LO
D6096	DC BUS 11B	VOLT LO-LO
D6097	DC BUS 11D	VOLT LO-LO

AND

3. NO ALARM HAS BEEN CLEARED WITHIN FIFTEEN MINUTES.

IF conditions 6f and 6e exist concurrently, refer to condition 6e AND 6f.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT if Condition 6a also exists

7a. Primary to secondary leakage greater than 500 gallons per day from any steam generator or steam generator specific activity greater than 0.1 μCi/cc dose equivalent I-131.

AND

6a. Buses E5 AND E6 are not powered from an offsite source for greater than 15 minutes.

NOTE

This Initiating Condition does not apply in Modes 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. ANY INDICATION OF PRIMARY TO SECONDARY LEAKAGE EXCEEDING 500 GALLONS PER DAY FROM ANY STEAM GENERATOR

OR

2. ANALYSIS OF A BLOWDOWN LIQUID SAMPLE BY THE CHEMISTRY DEPARTMENT INDICATES ACTIVITY GREATER THAN 0.1 μCi/cc DOSE EQUIVALENT I-131

AND

3. BUSES E5 AND E6 ARE NOT POWERED FROM AN OFFSITE SOURCE FOR GREATER THAN 15 MINUTES.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

8a. Reactor coolant specific activity greater than Technical Specification limits.

NOTE

This Initiating Condition does not apply in Modes 3 (with T_{avg} less than 500°F) 4, 5 and 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. CHEMISTRY DEPARTMENT SAMPLING RESULTS INDICATE THAT THE SPECIFIC ACTIVITY OF THE REACTOR COOLANT IS GREATER THAN 1 µCi/gm DOSE EQUIVALENT IODINE I-131 FOR MORE THAN 48 HOURS DURING ONE CONTINUOUS TIME INTERVAL

OR

2. CHEMISTRY DEPARTMENT SAMPLING RESULTS INDICATE THAT THE DOSE EQUIVALENT IODINE I-131 PRIMARY COOLANT SPECIFIC ACTIVITY IS EXCEEDING THE LIMIT LINE SHOWN IN TECHNICAL SPECIFICATION FIGURE 3.4-1

OR

3. CHEMISTRY DEPARTMENT SAMPLING RESULTS INDICATE THAT THE SPECIFIC ACTIVITY OF THE REACTOR COOLANT IS GREATER THAN $100/\bar{E}$ µCi/gm.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for SITE AREA EMERGENCY

8c. Containment post-LOCA monitors reading greater than or equal to 1,000 R/hr.

EMERGENCY ACTION LEVELS

1.	Containment dose rates are greater than or equal to 1,000 R/hr as indicated by CP-295 on BOTH channel 1AM106 and 1AM107

OR

2.	Containment dose rates are greater than or equal to 1,000 R/hr as indicated by CP-180 on BOTH channel RM-6576A and RM-6576B.

NOTE

If one channel is inoperable, the reading on the operable channel should be verified by a rise in or off-scale high readings on other containment monitors or personnel hatch monitor.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

9a. Unplanned loss of most UA panel hardwired annunciator alarms for greater than 15 minutes.

NOTE

This Initiating Condition does not apply in Mode 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. MOST OR ALL UA PANEL HARDWIRED ANNUNCIATOR ALARMS HAVE BEEN LOST FOR GREATER THAN 15 MINUTES

AND

2. COMPENSATORY INDICATIONS ARE AVAILABLE (E.G., MAIN CONTROL BOARD INDICATIONS, MPCS, VAS, SPDS, ETC.)

AND

3. THE LOSS OF THE UA PANEL HARDWIRED ANNUNCIATOR ALARMS REQUIRES INCREASED SURVEILLANCE TO SAFELY OPERATE THE STATION

AND

4. THE LOSS OF THE UA PANEL HARDWIRED ANNUNCIATOR ALARMS DID NOT RESULT FROM A PLANNED ACTION.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

9d. Unplanned loss of most UA panel hardwired annunciator alarms for greater than 15 minutes with a transient in progress OR without compensatory measures.

NOTE

This Initiating Condition does not apply in Modes 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. MOST OR ALL UA PANEL HARDWIRED ANNUNCIATOR ALARMS HAVE BEEN LOST FOR GREATER THAN 15 MINUTES

AND

2. THE LOSS OF THE UA PANEL HARDWIRED ANNUNCIATOR ALARMS REQUIRES INCREASED SURVEILLANCES TO SAFELY OPERATE THE STATION

AND

3. THE LOSS OF THE UA PANEL HARDWIRED ANNUNCIATOR ALARMS DID NOT RESULT FROM A PLANNED ACTION

AND

4. COMPENSATORY INDICATIONS ARE NOT AVAILABLE (E.G., MAIN CONTROL BOARD INDICATIONS, MPCS, SPDS, VAS, ETC.)

OR

5. A SIGNIFICANT PLANT TRANSIENT IS IN PROGRESS.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

10a. Loss of all control room communication.

EMERGENCY ACTION LEVELS

COMPLETE LOSS OF ALL THE FOLLOWING CONTROL ROOM COMMUNICATIONS: a. TELEPHONES, INCLUDING THOSE ON CP-295 AND b. RADIOS, INCLUDING THE MANCHESTER DISPATCHER AND c. GAITRONICS AND d. SOUND POWERED PHONES.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

12a. Site boundary dose rate greater than or equal to 0.06 mrem/hr.

EMERGENCY ACTION LEVELS

1.	DOSE PROJECTIONS OR EFFLUENT ANALYSIS INDICATES A PROJECTED TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) RATE GREATER THAN OR EQUAL TO 0.06 mrem/hr AT THE SITE BOUNDARY

OR

2.	FIELD MONITORING INDICATES A DOSE RATE GREATER THAN OR EQUAL TO 0.06 mrem/hr AT THE SITE BOUNDARY (SEE NOTE 1).

NOTE 1

This value is alternately called the "whole body" dose rate or "deep dose equivalent" rate. It is typically a "closed window" reading.

NOTE 2

Figure 2 provides computer generated assessment points and RDMS channel numbers to be used for dose assessment.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

12c. Significant loss in control of radioactive materials and an increase in radiation monitor(s) by a factor of 1000 or greater.

EMERGENCY ACTION LEVELS

1.	UNEXPECTED INCREASE IN AN AREA RADIATION MONITOR(S) BY A FACTOR OF 1000 OR GREATER

AND

2.	A SIGNIFICANT LOSS IN THE CONTROL OF RADIOACTIVE MATERIALS HAS OCCURRED.

NOTE

To determine a factor of 1000 increase, select the appropriate trend display on the alarming channel(s) to ascertain the rate of increase and approximate background value. If needed, verify the increase by survey or other means to confirm that the increase is a result of a significant loss in control of radioactive material.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for GENERAL EMERGENCY

12e. Site boundary Total Effective Dose Equivalent greater than or equal to 1,000 mrem or Adult Thyroid Committed Dose Equivalent greater than or equal to 5,000 mrem.

EMERGENCY ACTION LEVELS

1.	DOSE PROJECTIONS OR EFFLUENT ANALYSIS INDICATES A TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) OF GREATER THAN OR EQUAL TO 1,000 mrem AT THE SITE BOUNDARY FOR THE ACTUAL OR PROJECTED DURATION OF THE RELEASE

OR

2.	DOSE PROJECTIONS OR EFFLUENT ANALYSIS INDICATES AN ADULT THYROID COMMITTED DOSE EQUIVALENT (CDE) OF GREATER THAN OR EQUAL TO 5,000 mrem AT THE SITE BOUNDARY FOR THE ACTUAL OR PROJECTED DURATION OF THE RELEASE

OR

3.	FIELD MONITORING RESULTS INDICATE A DEEP DOSE EQUIVALENT (DDE) OF GREATER THAN OR EQUAL TO 1,000 mrem AT THE SITE BOUNDARY FOR THE ACTUAL OR PROJECTED DURATION OF THE RELEASE (SEE NOTE 1)

OR

4.	FIELD MONITORING RESULTS INDICATE AN ADULT THYROID COMMITTED DOSE EQUIVALENT (CDE) OF GREATER THAN OR EQUAL TO 5,000 mrem AT THE SITE BOUNDARY FOR THE ACTUAL OR PROJECTED DURATION OF THE RELEASE.

NOTE 1

This value is also called the "whole body" dose. It is typically based on a "closed window" reading.

NOTE 2

Figure 2 provides computer generated assessment points and RDMS channel numbers to be used for dose assessment.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for SITE AREA EMERGENCY

13b. Major damage to irradiated fuel with radiation release or loss of water in spent fuel pool or reactor cavity and irradiated fuel present.

EMERGENCY ACTION LEVELS

1. NOTIFICATION OF THE DROPPING, BUMPING, OR OTHERWISE ROUGH HANDLING OF AN IRRADIATED FUEL ASSEMBLY

AND

2. ANY INDICATION THAT RADIOACTIVITY HAS BEEN RELEASED FROM THE IRRADIATED FUEL ASSEMBLY. THESE INDICATIONS MAY INCLUDE:

- ALARMS OR ELEVATED READINGS ON AREA RDMS MONITORS
  - CONTAINMENT CP-295: 1AM102 or 1AM103
  - CONTAINMENT CP-180: RM-6535A or RM-6535B
  - FUEL STORAGE BLDG CP-295: 1AM401
- ALARMS OR ELEVATED READINGS ON PORTABLE RADIATION MONITORS
- ALARMS OR ELEVATED READINGS ON AIR MONITORS

AND

3. A VISUAL ASSESSMENT OF THE IRRADIATED FUEL ASSEMBLY INDICATES MAJOR DEFORMATION OR DAMAGE (E.G., CRUSHED OR BENT FUEL RODS, ALL RODS NOT WITHIN THE ASSEMBLY FRAME, ETC.)

OR

(Continued on next page)

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

14a. Abnormal reactor trip or safety injection.

NOTE

This Initiating Condition does not apply in Modes 4, 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. ENTRY INTO PROCEDURE ES-0.1, REACTOR TRIP RESPONSE, WITHOUT TRANSITIONING TO PROCEDURE OS1000.11, POST-TRIP TO HOT STANDBY

OR

2. ENTRY INTO PROCEDURE ES-1.1, SI TERMINATION, WITHOUT TRANSITIONING TO PROCEDURE OS1000.11, POST-TRIP TO HOT STANDBY

OR

3. TRANSITIONING BACK INTO PROCEDURE E-0, REACTOR TRIP OR SAFETY INJECTION, FROM PROCEDURE FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

15b. Faulted Steam Generator Isolation (E-2).

NOTE

This Initiating Condition does not apply in Modes 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

INITIATION OF EMERGENCY PROCEDURE E-2, FAULTED STEAM GENERATOR ISOLATION.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for SITE AREA EMERGENCY

15d. Loss of Reactor Coolant with ECCS required.

NOTE

This Initiating Condition does not apply in Modes 4, 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. INITIATION OF EMERGENCY PROCEDURE E-1, LOSS OF REACTOR OR SECONDARY COOLANT

AND

2. RCS SUBCOOLING BASED ON CORE EXIT THERMOCOUPLES IS LESS THAN 40°F

OR

3. PRESSURIZER LEVEL IS LESS THAN OR EQUAL TO 5% (35% IF CONTAINMENT PRESSURE IS GREATER THAN 4 PSIG).

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for GENERAL EMERGENCY

15f. Loss of emergency coolant recirculation (ECA-1.1).

NOTE
This Initiating Condition does not apply in Modes 4, 5 or 6, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

INITIATION OF EMERGENCY PROCEDURE ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

16b. Fire potentially or actually defeating one train of a safety system

EMERGENCY ACTION LEVELS

1. VERIFICATION OF AN ACTUAL FIRE AS REPORTED BY THE FIRE BRIGADE LEADER

AND

2. A VALID "S" OR "P" SIGNAL EXISTS

AND

3. THE FIRE HAS DISABLED, OR HAS THE POTENTIAL TO DISABLE, ONE OPERABLE TRAIN OF ANY OF THE FOLLOWING SYSTEMS: a) Charging b) Safety Injection c) Residual Heat Removal d) Containment Building Spray e) Emergency Feedwater f) Containment Phase A Isolation Valves g) Containment Phase B Isolation Valves (SEE NOTE BELOW)

NOTE If the remaining (unaffected by the fire) train is also inoperable, refer to Initiating Condition 16c.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

17a. Control Room evacuation anticipated or required with safe shutdown capability established.

EMERGENCY ACTION LEVELS

A determination by the Shift Manager that:

CONTROL ROOM EVACUATION IS ANTICIPATED

OR

CONTROL ROOM EVACUATION HAS OCCURRED AND SAFE SHUTDOWN CAPABILITY HAS BEEN ESTABLISHED WITHIN 15 MINUTES OF THE ANNOUNCEMENT FOR MANNING THE REMOTE SAFE SHUTDOWN PANELS PER PROCEDURE OS1200.02.

NOTE 1

In the event of a Control Room evacuation, Short Term Emergency Director (STED) actions may be performed from the Alternate TSC in Administration Building Room 219. If time permits, take the STED packet from the Control Room with you; if not, SSER Manual checklists and forms are available in a file cabinet in Room 219. Announce that TSC personnel should assemble in Room 245 of the Administration Building and await further instructions.

NOTE 2

Verify that Remote Safe Shutdown (RSS) capability was established within 15 minutes of the announcement to man the RSS panels; if not, declare a Site Area Emergency in accordance with Initiating Condition 17b. RSS capability is established when at least one RSS panel is manned.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

18a. Hazards experienced or projected which involve potential degradation of station safety.

EMERGENCY ACTION LEVELS

NATURAL PHENOMENA

1. ANY SEISMIC ACTIVITY LESS THAN OBE LEVELS AS INDICATED BY:

   a) VAS ALARM

D POINT	MESSAGE
5452	SEISMIC EVENT IN PROGRESS

   AND

   b) YELLOW "EVENT" LIGHT LIT AND RED "OBE" LIGHT OFF ON SEISMIC MONITORING CONTROL CABINET 1-SM-CP-58 POWER PANEL

   AND

   c) EITHER OF THE FOLLOWING:

      (1) THE EARTHQUAKE IS FELT BY STATION PERSONNEL

      OR

      (2) THE EARTHQUAKE OCCURRENCE IS VERIFIED DURING IMPLEMENTATION OF PROCEDURE ES1802.001, SEISMIC RESPONSE PROCEDURE

OR

2. TORNADO STRIKING ANYWHERE ON SITE

OR

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for UNUSUAL EVENT

18a. (Continued)

MANMADE EVENTS

1.	AN AIRCRAFT CRASH ANYWHERE ON SITE THAT MAY ADVERSELY IMPACT NORMAL STATION OPERATIONS

OR

2.	AN EXPLOSION ANYWHERE NEAR SITE OR ON SITE THAT MAY ADVERSELY IMPACT NORMAL STATION OPERATIONS

OR

3.	A RELEASE OF TOXIC OR FLAMMABLE GAS FROM ANYWHERE NEAR SITE OR ON SITE THAT MAY ADVERSELY IMPACT NORMAL STATION OPERATIONS

OR

4.	PLANT SHUTDOWN DUE TO TURBINE DAMAGE WITHOUT CASING PENETRATION. a) A VALID TURBINE TRIP SIGNAL EXISTS AND b) TURBINE BEARING VIBRATION EXCEEDS 15 MILS AND c) EXCESSIVE OR UNUSUAL TURBINE NOISE EXISTS.

DISCRETIONARY EVENTS

AN EVENT IS IN PROGRESS OR HAS OCCURRED THAT INDICATES A POTENTIAL DEGRADATION OF THE LEVEL OF SAFETY OF THE STATION.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

18b. (Continued)

3.	WIND SPEEDS EXCEEDING 90 MPH FOR GREATER THAN OR EQUAL TO 5 MINUTES.

VAS INDICATORS

A POINT	MESSAGE
A1626	UPPER WIND SPEED (INSTANT), OR
A1628	LOWER WIND SPEED (INSTANT)

OR

4.	POTENTIAL SITE FLOODING AS INDICATED BY WATER LEVEL APPROACHING THE TOP OF THE SEA WALL.

MANMADE EVENTS

1.	AN AIRCRAFT CRASH IMPACTING ON ANY PERMANENT STRUCTURE INSIDE THE PROTECTED AREA THAT CONTAINS SYSTEMS REQUIRED FOR SAFE SHUTDOWN

OR

2.	AN EXPLOSION OR MISSILE IMPACT DAMAGING ANY PERMANENT STRUCTURE INSIDE THE PROTECTED AREA THAT CONTAINS SYSTEMS REQUIRED FOR SAFE SHUTDOWN

OR

3.	UNCONTROLLED RELEASE OF SIGNIFICANT QUANTITIES OF A TOXIC OR FLAMMABLE GAS ANYWHERE INSIDE OR INTO THE PROTECTED AREA
	AND
4.	THE CONCENTRATION OF THE GAS MAY (OR HAS) ADVERSELY IMPACT(ED) NORMAL STATION OPERATIONS

OR

5.	TURBINE FAILURE WITH CASING PENETRATION.

DISCRETIONARY EVENTS

AN EVENT IS IN PROGRESS OR HAS OCCURRED THAT INVOLVES AN ACTUAL OR POTENTIAL SUBSTANTIAL DEGRADATION OF THE LEVEL OF SAFETY OF THE STATION.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition For SITE AREA EMERGENCY

18c. Hazards experienced or projected which involve major failures of station functions needed for public protection.

EMERGENCY ACTION LEVELS

NATURAL PHENOMENA

1. SSE EARTHQUAKE AS INDICATED BY:

a) VAS ALARM

D POINT	MESSAGE
5452	SEISMIC EVENT IN PROGRESS

AND

b) YELLOW "EVENT" LIGHT LIT AND RED "OBE" LIGHT LIT ON SEISMIC MONITOR CONTROL CABINET 1-SM-CP-58 POWER PANEL

AND

c) THE EARTHQUAKE IS FELT BY STATION PERSONNEL

AND

d) AN SSE EARTHQUAKE OCCURRENCE IS VERIFIED DURING IMPLEMENTATION OF PROCEDURE ES1802.001, SEISMIC RESPONSE PROCEDURE

OR

2. WIND SPEEDS EXCEEDING 110 MPH FOR GREATER THAN OR EQUAL TO 5 MINUTES

VAS INDICATORS

A POINT	MESSAGE
A1626	UPPER WIND SPEED (INSTANT), OR
A1628	LOWER WIND SPEED (INSTANT)

OR

3. SITE FLOODING AS INDICATED BY WATER LEVEL OVER THE SEA WALL.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for GENERAL EMERGENCY

18d. Hazards experienced or projected which involve substantial core degradation and/or gross loss of containment integrity.

EMERGENCY ACTION LEVELS

NATURAL PHENOMENA/MANMADE EVENTS

THERE HAS BEEN OR WILL BE MAJOR INTERNAL OR EXTERNAL EVENTS THAT COULD CAUSE OR HAVE CAUSED MASSIVE COMMON DAMAGE TO PLANT SYSTEMS RESULTING IN ANY OF THE GENERAL EMERGENCY INITIATING CONDITIONS.

SECURITY THREATS

A VITAL AREA HAS BEEN OCCUPIED BY AN ARMED, HOSTILE INTRUDER(S).

DISCRETIONARY EVENTS

AN EVENT IS IN PROGRESS OR HAS OCCURRED THAT INVOLVES ACTUAL OR IMMINENT SUBSTANTIAL CORE DEGRADATION OR MELTING WITH POTENTIAL FOR LOSS OF CONTAINMENT INTEGRITY.

Figure 1
Miscellaneous Emergency Conditions and Emergency Action Levels
(Continued)

Initiating Condition for ALERT

19b. Loss of shutdown cooling with RCS loops not filled

NOTE

This Initiating Condition does not apply in Modes 1, 2, 3, or 4, or when the reactor vessel is defueled.

EMERGENCY ACTION LEVELS

1. IRRADIATED FUEL IS PRESENT IN THE REACTOR VESSEL

AND

2. RCS IS ALIGNED FOR SHUTDOWN COOLING

AND

3. SHUTDOWN COOLING HAS BEEN LOST

AND

4. RCS LOOPS ARE NOT FILLED

NOTE - REFER TO TECHNICAL CLARIFICATION #162 FOR DEFINITION OF RCS LOOPS FILLED.

AND

5. ONE HOUR HAS ELAPSED SINCE SHUTDOWN COOLING WAS LOST

OR

6. RCS TEMPERATURE GREATER THAN 200° F.

Figure 2
Dose Assessment Data Points

MPC POINTS/ RDMS CHANNEL #	DESCRIPTION	UNITS/MEASURE
C3000	Time after Shutdown	hr/min
C0784	Upper Wind Speed	mph
C0786	Upper Wind Direction (from)	deg
C0783	Lower Wind Speed	mph
C0785	Lower Wind Direction (from)	deg
C0787	Lower Delta Temp E1 150/43	F
C0788	Upper Delta Temp E1 209/43	F
C0797	Precipitation	in/qtr hr
C0798	Solar Radiation	Langley/min.
A3778	Contm Encl/Outside Atmos DP	(-)In. Wc.
C0726	Contm Avg Press (Band)	psig
C1000	Contm Dose Rate (Have)	R/hr
AM104	Lo Range Personnel Hatch	mr/hr
AM105	Hi Range Personnel Hatch	mr/hr
1NG222, 223 & 224	WRGM Concentration	µCi/cc
1CC225	Plant Discharge Rate	µCi/sec
1GM801	Main Steam Line Loop 1	mr/hr
1GM803	Main Steam Line Loop 2	mr/hr
1GM804	Main Steam Line Loop 3	mr/hr
1GM802	Main Steam Line Loop 4	mr/hr
D5214	ASDV A	Open/Closed
D5215	ASDV B	Open/Closed
D5216	ASDV C	Open/Closed
D5217	ASDV D	Open/Closed
C3145	SG A Avg Pressure Band	psig
C3146	SG B Avg Pressure Band	psig
C3147	SG C Avg Pressure Band	psig
C3148	SG D Avg Pressure Band	psig

STANDING OPERATING ORDER NO. 99-015

Operation During the Safety-Related CBA System Design Change Implementation

License Amendment 62 has approved the addition of a note to the Seabrook Station Technical Specification (TS) 3.7.6.2 to extend, on a one time basis (per train), the allowable outage time (AOT) with one Control Room Air Conditioning Subsystem inoperable from 30 days to 60 days. This change is necessary in order to facilitate the implementation of design enhancements that will improve maintainability and reliability of the safety-related Control Room Air Conditioning units. License Amendment 62 has also approved an exception to the requirements of TS 3.0.4 and surveillance requirements (SR) TS 4.0.4 as they pertain to TS 3.7.6.2 during the implementation of the design enhancements to the Control Room Air Conditioning units.

The following 'administrative controls' shall be initiated to ensure that Seabrook Station;

1) will not enter the 'one time extension' of the applicable action statement of TS 3.7.6.2 on a per train basis to permit implementation of the design enhancements to the safety-related Control Room Air Conditioning units **unless the non safety-related chill water subsystem is functional**, and

2) will not exercise the exceptions to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 on a per train basis to permit implementation of the design enhancements to the safety-related Control Room Air Conditioning units **unless the non safety-related chill water subsystem is functional.**

* A pre-job briefing shall be conducted to ensure station personnel involved in the design implementation are aware of the following:

* License Amendment 62 has authorized a 'one time extension' of the allowed outage time and exceptions to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 on a per train basis **provided the non safety-related chill water subsystem is functional prior** to initiating implementation of the design change enhancements.

* In the event that the OPERABLE train of the safety-related Control Room Air Conditioning subsystem fails during implementation of the design change enhancements, the station shall enter TS 3.0.3 and initiate the appropriate actions.

* In the event that a non safety-related chill water unit fails during implementation of the design change enhancements, the station shall initiate corrective actions to place a functional non safety-related chill water unit or the remaining OPERABLE safety-related Control Room Air Conditioning unit in service and expedite repairs on the unit that has malfunctioned.

* In the event of a plant trip, the provisions of TS 3.0.4 and TS 4.0.4 shall not apply to TS 3.7.6.2 during a restart of the plant provided the requirements of having an OPERABLE train of the Control Room Air Conditioning subsystem and a functional non safety-related chill water subsystem are met.

*** The 'one time extension' of the allowed outage time as it pertains to TS 3.7.6.2 on a per train basis shall be considered expired, 1) upon declaration of the train's OPERABILITY following completion of the design enhancements and the applicable retests or 2) upon reaching the 60 day time period.**

- **The exceptions to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 on a per train basis shall be considered expired, 1) upon declaration of the train's OPERABILITY following completion of the design enhancements and the applicable retests or 2) upon reaching the 60 day time period.**

*** The exceptions to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 on a per train basis do not apply until the requirements for having an OPERABLE train of the safety-related Control Room Air Conditioning subsystem and functional non safety-related chill water subsystem are met.**

Standing Operating Order Evaluation Form

1.	SOO NUMBER: 99-015	SHEET OF
2.	SOO TITLE: Operation During the Safety-Related CBA System Design Change Implementation	
3.	INITIATOR: Scott S. Samstag	DATE: 10/15/99
4.	10 CFR 50.59 SCREENING	

Does the proposed change:

A. Make changes in the facility as described in the UFSAR? License Amendment 62 approves a 'one time extension' (per train) of the allowed outage time specified within in TS 3.7.6.2 to allow the implementation of design changes to the safety related Control Room air conditioning units. License Amendment 62 also approves taking exception to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 during the implementation of the design changes. This order delineates specific administrative guidance to adhere to during the implementation of the design changes any does not make any changes to the facility. A separate 50.59 screening of the design change will be performed to support the specific changes to the facility as described in section 9.4.1 of the Updated Final Safety Analysis Report.

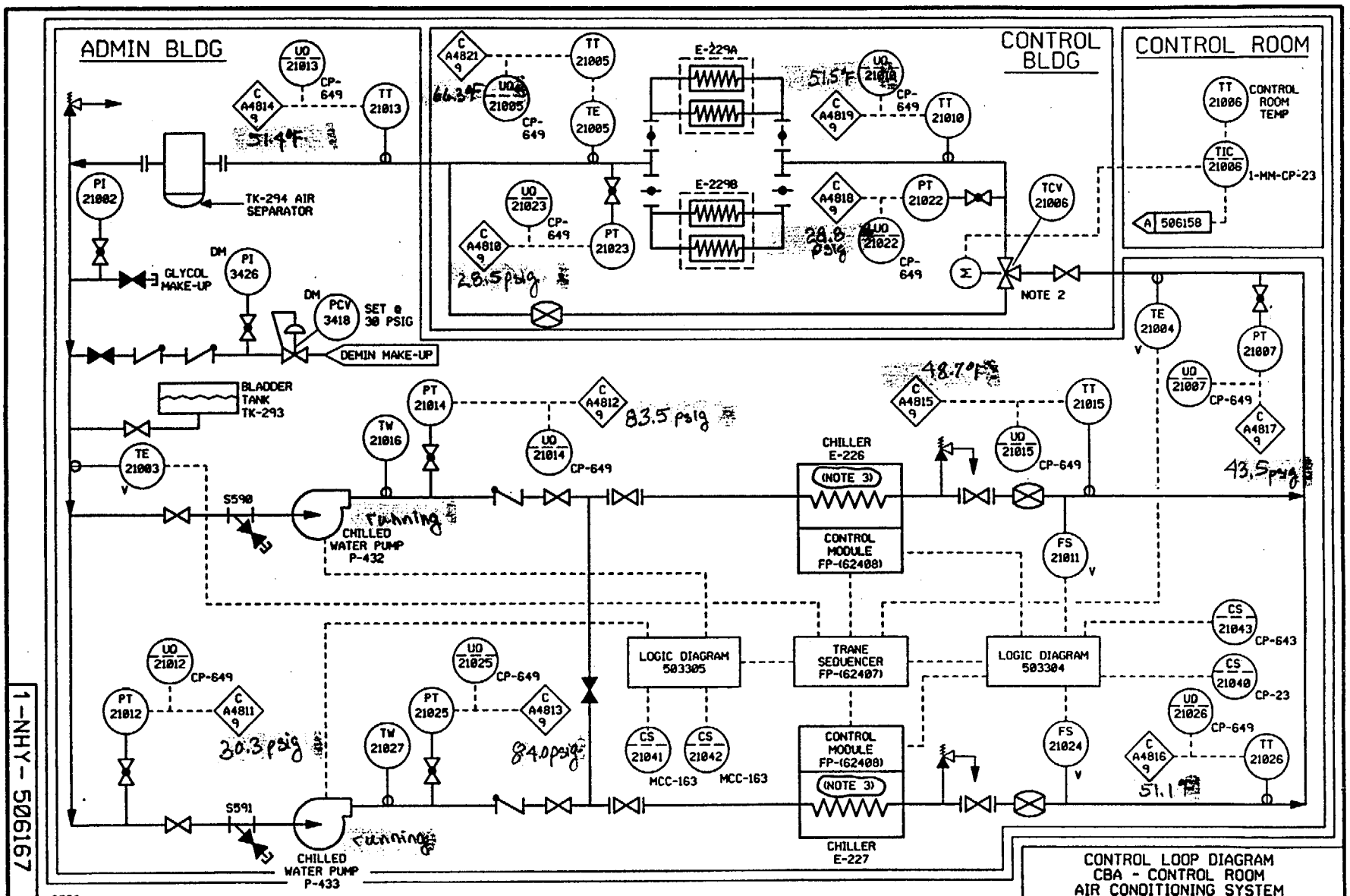
☐ YES X NO

B. Make changes in procedures as described in the UFSAR? License Amendment 62 approves a 'one time extension' (per train) of the allowed outage time specified within in TS 3.7.6.2 to allow the implementation of design changes to the safety related Control Room air conditioning units. License Amendment 62 also approves taking exception to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 during the implementation of the design changes. No procedures will be affected during implementation of the design changes. This order delineates specific administrative guidance to adhere to during the implementation of the design changes and does not affect any station procedures. A separate 50.59 screening of proposed procedure changes as described in section 9.4.1 of the Updated Final Safety Analysis Report will be performed to support required procedure changes following implementation of the design changes.

☐ YES X NO

C. Involve tests or experiments not described in the UFSAR? License Amendment 62 approves a 'one time extension' (per train) of the allowed outage time specified within in TS 3.7.6.2 to allow the implementation of design changes to the safety related Control Room air conditioning units. License Amendment 62 also approves taking exception to TS 3.0.4 and TS 4.0.4 as they pertain to TS 3.7.6.2 during the implementation of the design changes. This order delineates specific administrative guidance to adhere to during the implementation of the design changes and does not involve any tests or experiments. Surveillance (testing) requirements will be waived during the implementation of the design changes.

☐ YES X NO



NOTES:
1. SYSTEM PREFIX IS "CBA" UNLESS OTHERWISE NOTED.
2. TCV 21006 FAILS AS IS ON LOSS OF POWER, FAILS TO FULL COOLING ON LOSS OF SIGNAL WITH POWER.
3. CHILLER EVAPORATOR BARREL IS HEAT TRACED.

REFERENCE DOCUMENTS:
1-CBA-20309
1-DM-20355

REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
1	3/16/99	MRJ	JWB	JPS	RWM	INCORP. DCR 98-025 DCN-31
0	10-2-98	MRB	JWB	BAW	CM	FIRST ISSUE PER DCR 98-025, DCN-26

CONTROL LOOP DIAGRAM
CBA - CONTROL ROOM
AIR CONDITIONING SYSTEM
NNS CHILLED WATER SYSTEM

North Atlantic
Energy Service Corporation

1-NHY-506167 REV: 1

1-NHY-506167 REV: 1

D6626 DG B WATER JACKET PRESSURE LOW

SETPOINT: 30 PSIG WITH DG B SPEED GREATER THAN 375 RPM FOR 7 SECONDS

INITIATING DEVICE: DGB-PS-CPLA

ASSOCIATED AUTO ACTIONS: PISTON OPERATED VALVES (DG-V11B AND DG-V12B) SHIFT ALIGNMENT TO THE AUX COOLANT PUMP AND DG-P-122B STARTS

REVISION: 04

1.0 RECOMMENDED ACTIONS:

1.1 VERIFY THAT DG-P-122B, AUX COOLANT PUMP IS IN SERVICE:

1.1.1 DG-PI-9552, DG-P-122B SUCTION PRESSURE IS 15 TO 25 PSIG

1.1.2 DG-PI-9553, DG-P-122B DISCHARGE PRESSURE IS 45 TO 60 PSIG

1.1.3 DG-V12B AND DG-V11B, PISTON OPERATED VALVES ARE ALIGNED TO THE AUX COOLANT PUMP HEADER.

1.2 CHECK EXPANSION TANK LEVEL ON DG-LG-2B GREATER THAN 50 PERCENT.

1.3 CHECK THE POSITION OF DG-PV-7B-1, JACKET WATER PRESSURE CONTROL VALVE.

1.4 IF NOT RUNNING IN AN EMERGENCY MODE, OR AS DIRECTED BY THE US, SHUTDOWN THE DIESEL.

1.5 CHECK THE STATUS OF THE SHAFT DRIVEN JACKET WATER PUMP.

NOTE

THE DIESEL GENERATOR WILL TRIP ON A HIGH JACKET WATER TEMERATURE OF 190 DEGREES F. THIS TRIP IS BYPASSED WHEN THE DIESEL GENERATOR IS STARTED BY AN SI/EMERGENCY START SIGNAL.

1.6 MONITOR THE ENGINE CYLINDER TEMPERATURES AT CP-78.

1.7 REFER TO TECH SPECS AS APPLICABLE: T.S. 3.8.1.1 AC SOURCES - OPERATING
T.S. 3.8.1.2 AC SOURCES - SHUTDOWN

2.0 SOURCES OF ADDITIONAL INFORMATION:

2.1 LOOPS & LOGICS TAB DG; 503486, 506406

2.2 P&ID 1-DG-B20466

2.3 SCHEMATIC 310102, SHEET G19

2.4 AT DG-CP-76A, UA-9568 E-6, JACKET WATER PRESSURE LOW