SIMULATOR EXAMINATION SCENARIO

SCENARIO TITLE: SGTR

SCENARIO NUMBER: I ILT NRC ESG-001

EFFECTIVE DATE: 12/4/6

EXPECTED DURATION: 1.5 hours

REVISION NUMBER: 00

PROGRAM:

- [ ] **L.O. REQUAL**
- [X] **INITIAL LICENSE**
- [ ] **STA**
- [ ] **OTHER** _____

Revision Summary:

Rev 0: New Issue for I ILT NRC exam

PREPARED BY:	Paul Williams **(INSTRUCTOR)**	10/9/06 **(DATE)**
APPROVED BY:	_____ **(OPERATIONS TRAINNG MANAGER OR DESIGNEE)**	_____ **(DATE)**
APPROVED BY:	_____ **(OPERATIONS MANAGER OR DESIGNEE)**	_____ **(DATE)**

I. OBJECTIVES

Enabling Objectives

A. Given the unit at power the crew will reduce power to remove a Heater Drain Pump from service, IAW approved station procedures.

B. Given the unit at power with a failure of a Pressurizer Pressure control channel, the crew will take action to stabilize RCS pressure and swap to a non-failed channel, IAW approved station procedures.

C. Given the unit with a leak in a SW bay, the crew will take action to isolate the leak, IAW approved station procedures.

D. Given a SGTL, the crew will identify and isolate the leaking SG, IAW approved station procedures.

E. Given the unit with a SGTR and loss of off-site power, take actions to minimize off site dose and RCS leakage, IAW approved station procedures.

II. MAJOR EVENTS

A. Power Reduction to 90%

B. Pressurizer Pressure Channel 1 Fails High

C. #2 SW Bay Leak

D. SGTL

E. SGTR on 21 SG with Loss of Off-Site Power and "B" Vital Bus

III. SCENARIO SUMMARY

A. The crew will receive the unit at 100% power with all system in automatic. One major piece of equipment will be C/Ted, 2B D/G.

B. Once the crew takes the watch they will reduce reactor power to 90% at 30% per hour to remove 22 Heater Drain pump from service due to an emergent mechanical seal leak.

C. Once the power reduction to 90% is underway Channel 1 Pressurizer Pressure will fail high. The RO will take manual control of the Master Pressure Controller and adjust demand to stabilize RCS pressure. The CRS will enter AB.PZR-0001 and direct crew actions to remove the channel from service.

D. After AB.PZR-0001 has been completed to the point of determining channel operability a leak will begin in #2 SW Bay. The CRS will enter AB.SW-0003 and direct crew actions to isolate and remove #2 bay from service.

E. When the bay isolated a SGTL will occur on 21 SG. The CRS will enter AB.SG-0001 and direct the crew to perform actions to address the SGTL. During the SGTL, the SG tube will rupture. The CRS will direct a manual SI initiation.

F. The RO will manually initiate SI and commence the Immediate Actions of EOP-TRIP-1. The CRS will enter EOP-TRIP-1. During the performance of EOP-TRIP-1 a loss of off-site power will occur coincident with the loss of "B" Vital Bus. This will necessitate the crew manually isolating service water to the turbine building.

G. The crew will perform actions of EOP-TRIP-1 and then transition to EOP-SGTR-1

IV. INITIAL CONDITIONS

____ Presnapped IC-191 from portable exam drive

MALFUNCTIONS:

SELF-CHECK	Description	Delay	Ramp	Trigger	Severity
____ 1.	VL0055 23SW20 Fails to Position	NA	NA	NA	100
____ 2.	VL0053 2SW26 Fails to Position	NA	NA	NA	100
____ 3.	PR0016A Ch 1 Prz Press Fails High	NA	NA	ET-1	2500
____ 4.	SW0216A 2 SW Bay Leaks	NA	1 min	ET-2	10000
____ 5.	SG0078A SG Rupture	NA	3:00	ET-3	25
____ 6.	EL0134 Loss of Off-Site Power	:30	NA	ET-4	NA

REMOTES:

SELF-CHECK	Description	Delay	Ramp	Trigger	Condition
____ 1.	DG19D 2B D/G Locked Out	NA	NA	NA	Yes
____ 2.	DG21D 2B DG BKR Rack Out	NA	NA	NA	Tagged
____ 3.	DG20D 2B DG BKR Control Power	NA	NA	NA	Off
____ 4.	PR34D PORV Stop Valve 2PR6 Tagged	NA	NA	RT-10	Tagged
____ 5.	SW23D – 21 SW Pump Control Power	NA	NA	RT-11	Off
____ 6.	SW27D – 22 SW Pump Control Power	:30	NA	RT-11	Off
____ 7.	SW32D – 23 SW Pump Control Power	:60	NA	RT-11	Off

OVERRIDES:

SELF-CHECK	Description	Delay	Ramp	Trigger	Action
____ 1.	AI06 OVAO BIT Flow meter failed	NA	NA	NA	0

EVENT TRIGGERS:

SELF-CHECK	ET#n	Discription	Command
____ 1.	ET-4	MONP 254<10	
____ 2.	ET-5	KA915TC4	DMF VL0055

TAGGED EQUIPMENT:	
	Description
____	1. RH1 and RH2
____	2. VC 1-4
____	3. RH 18's
____	4. RCPs (SELF CHECK)
____	5. RT (SELF CHECK)
____	6. MS 167s (SELF CHECK)
____	7. 500 KV SWYD (SELF CHECK).
____	8. 22 ABV Supply Fan
____	9. 23 CV Pump (SELF CHECK)
____	10. 2B D/G (C/T)

OTHER CONDITIONS:	
	Description
____	1. Ensure Channel 1 Pressurizer Pressure selected for control

V. SEQUENCE OF EVENTS

A. State shift job assignments:

B. Hold a shift briefing, detailing instruction to the shift: (provide CREW members a copy of the shift turnover sheet)

C. Inform the crew "The simulator is running. You may commence panel walkdowns at this time. CRS please inform me when your crew is ready to assume the shift".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

E. Do not review objectives with crew

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
1. Power Reduction to 90%		
CREW will be provided with a OP-AP-300-1004 filled out with correct information for power reduction boration	• CRS briefs crew on evolution	
IO.ZZ-0004 will be entered but no major action is required until 85%	• CRS implements S2.OP-IO.ZZ-0004 • CRS directs RO/PO to commence a power reduction to 90% at 30% per hour • PO sets-up DEHC for correct reduction and rate IAW S2.OP-SO.TRB-0002 • CRS directs RO to commence a boration at rate and gallon amount as determined during brief IAW S2.OP-SO.CVC-0006 • RO monitors reactor parameters to maintain Tavg within programmed value • PO monitors main turbine response • PO monitors SGFP suction pressure to ensure it remains greater than 320 psig • PO monitors condenser Delta T's • RO commences boration IAW S2.OP-SO.CVC-0006 • PO informs CRS when CRS when power has reduced to 90% • RO informs CRS when boration has been completed and returns boration control to automatic	
Proceed to next event when the power reduction has proceeded to the satisfaction of the lead evaluator	• CREW reviews S2.OP-SO.TD-0001 to remove 22 Heater Drain Pump from service	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	service	

2. Pressurizer Pressure Channel 1 Fails High

Enter ET-1, PZR PR Channel 1 fails to 2500		
Crew may decide to suspend load reduction if not completed until PZR pressure is stabilized	• RO reports that Pressurizer Pressure Channel 1 has failed high and requests permission to take master pressure controller to manual	**SH.OP-AP.ZZ-0102 rules of usage**
	• CRS concurs with RO assessment and directs master pressure controller placed in manual	
	• CRS enters S2.OP-AB.PZR-0001	
	• CRS directs PO to implement CAS	
	• RO reports POPS is not in service	
	• RO reports that controlling pressurizer pressure channel is failed	
	• RO adjust master pressure controller to be consistent with attachment 2	
	• RO selects channel 3 for controlling channel	
RO may request permission to wait until pressure has returned to normal operating control band. This is an acceptable alternative.	• RO returns master pressure controller to Auto	
Brief may occur after PR6 has been closed and S2.OP-SO.RPS-0003 has been implemented. Either time is acceptable	• CRS conducts brief and discusses contingent actions. Also during brief informs crew that TSAS 3.3.2.1 b 19, 3.3.1.1. act 6 and 3.4.5b are applicable.	
	• CRS directs RO to close 2PR6 to comply with technical specifications	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• RO closes 2PR6	
3 minutes after requested, call for 1st check and then enter RT-10 to open breaker	• CRS directs WCC to have breaker opened IAW SH.OP-AP.ZZ-0103	
	• CRS directs PO to implement S2.OP-SO.RPS-0003	
	• PO initiates S2.OP-SO.RPS-0003	
Proceed to next event when PO has initiated		
Continue to next page		

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

3. SW Bay Leak

Insert RT-2 SW Bay Leak at direction of Lead evaluator

- CREW responds to OHA alarms
  - B-13 and 14: 21 and 22 SW HDR Press LO
  - B-29: 21-23 SW Pmp Sump Area Lvl HI.
- RO acknowledges standby SW Pump start.
- CRS enters AB.SW-0001 or goes directly to AB.SW-0003.
- Crew monitors AB.SW-0003 CAS.

ROLE PLAY: After ~ 3 minutes report water level in #2 SW Bay is about 2' and rising.

- CREW dispatches operator to investigate.
- RO opens 21 & 22SW23, Nuc Hdr X-over MOVs.
- RO closes 21 & 22SW17, Pump Disch X-over MOVs.

Simulator Operator: When requested turn 125 VDC control power off to #2 SW Bay Pumps using the following remotes: Perform 1st check
RT-11, SW23D, 21 SW Pump Final Value = Off
RT-11, SW27D, 22 SW Pump Final Value = Off, 30 sec TD
RT-11, SW32D, 23 SW Pump Final Value = Off, 60 sec TD

- Crew isolates 2 SW Bay:
  - RO starts 24 SW Pump.
  - RO stops 21&23 SW Pumps.
  - CRS directs NEO to open 125 VDC Control Power to 2 Bay SW Pumps.
  - RO closes 21SW22, NucHdr Inlet.
  - RO closes 21SW20, TurbHdr Supply.

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• Crew initiates actions to remove 1 CCHX from service IAW S2.OP-SO.CC-0002 IAW CAS 4.0.	
ROLE PLAY: If requested, NEO reports #2 SW Bay level has stopped rising	• SM contacts maintenance services to assist with dewatering	
	• CRS enters AB-ZZ-0002 for flooding	
With 2 Bay inoperable, 24 SW pump does not have diesel back-up, so only C bus pumps are operable	• CRS refers to Tech Specs and determines that TS 3.8.1.1.b, action b.2 and 3.7.4 for 1 SW header inoperable	
4. Tube Leak on 21 SG **ENTER RT-3 21 SGTL, 25 GPM after TSAS determination as directed by Lead evaluator**		
	• RO reports OHA A-8 verifies on CRT 2R53A in alarm	
	• CRS directs monitoring of 2R19A to confirm status of SGTL	
	• PO informs CRS that 2R19A is rising as expected for tube leak	
	• CRS enters S2.OP-AB.SG-0001	
	• CRS directs RO to implement Attachment 1 CAS	
	• CRS directs NEO to de-energize turbine and polisher area sumps	
RO may initially report PZR level as stable due to slow ramp of SGTL	• RO reports PZR level lowering slowly	
	• CRS directs a swap to centrifugal charging pump	
	• RO places a centrifugal charging pump in service by performing the following: o Closing CV55	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	○ Starts 21 or 22 CV Pump ○ Places 23 CV pump in manual and lowers speed ○ Adjust CV55 to maintain stable charging flow and seal injection flow ○ Stops 23 CV Pump ○ Places CV55 in automatic	
Due to small size of leak, PZR level can be stabilized and CRS may decide to not reduce letdown	• CRS directs letdown flow to minimum	
	• RO reduces letdown to minimum	
At some point during performance of AB.SG-0001 the CRS may stop to have a brief and discuss actions and contingencies	• RO adjusts charging to stabilize Pressurizer level and estimate leak rate	
Leak rate is >140 gpd Once shut down determination is made, when directed by the lead examiner, Modify SG0078B to 900 gpm no ramp Record Time: : :	• SM/CRS/STA determine that Action level 3 is met and Unit must be in Mode 3 in the next 6 hours	
	• RO informs CRS that leak rate has increased and PZR level is lowering rapidly	
	• CRS briefs crew that leak is beyond capacity of makeup system and directs a Rx trip and SI	
5. SGTR **Note: Loss of Off-Site power Malf: EL0134 will auto enter 30 sec after Rx Trip as will loss of "B" vital bus**	• RO trips reactor, confirms Rx trip and initiates SI	
	• RO performs I/As of EOP-TRIP-1	
	• CRS enters EOP-TRIP-1	
	• CRS confirms immediate actions	
	• RO announces reactor trip and request	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	SM and STA report to control room	
CAS item to isolate 21 SG SH.OP-AP.ZZ-0102 rules of usage for AFW		
CT#1 (E-3 -A) Close 21AF11 and 21 within 10 min on identification of fault and complete isolation of Ruptured Steam Generator Time of Isolation: ____:____:____ SAT_____ UNSAT_____	• When Immediate Actions are complete PO requests permission to throttle AFW and isolate 21 SG by closing 21AF11 and 21	
	• CRS directs action as requested	
	• CREW continues with EOP-TRIP-1	
	• PO evaluates AFW status and SEC Loading and reports that 22 AFW Pump is unavailable and that all equipment is loaded as expected except that 2B Vital Bus de-energized due to 2B EDG tag-out	
2SW26 on "B" bus, thus no power Crew may decide to start 26 SW pump due to low pressure. This pump should not be started due to concern for overloading EDG. 1 pump is sufficient if the turbine header is isolated .	• PO determines that valves 2SW26 and 23SW20 have not closed as required and SW header pressure is <30psig	
CT#2 (E-0 -L): Manually start and align the minimum ESW pumps in an operating safeguard train prior to transition from EOP-TRIP-1 SAT_____ UNSAT_____	• CRS directs 23SW20 closed since 2SW26 has no power	
	• RO determines containment pressure has remained less than 15 psig	
	• CRS conducts brief to discuss plant status and minimizes length due to time critical nature of SGTR	
Should be 23 CC Pump since 22 is unavailable	• CRS directs RO/PO to start one CCW pump IAW EOP-APPX-1	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
Remote SW01D to reset, this can not be reset until SEC for A bus is reset	o RO starts 23 CCW Pump by blocking 2C SEC o Verifying 22CS Pump is stopped and 22CS2 is closed o Sends and operator to place 21 CCHX in service o Closes 22CC3 • RO evaluates SI status as within limits, however, BIT flow is zero. • CREW validates that charging pumps have correct amps and valve lineup is correct • PO maintains AFW flow >22E4 lbm/hr until 1 SG is greater than 9% and then throttles to maintain 9-33% • RO informs CRS that RCS temperature is stable at 547°F • RO reports Reactor Trip Breakers are open • RO reports both Pressurizer PORVs are closed, however, only 2PR7 is open • PO evaluates all steam generator pressure are stable or rising and no faulted steam generator exist • CREW transitions to SGTR-1 based on 21 SG Level rising in an uncontrolled manner • CREW identifies 21 SG as ruptured SG • PO adjusts 21MS10 setpoint to 1045 psig • PO closes 21MS7, 18, 167 and GB4 • PO determines 23 AFW pump is not required to maintain feed flow since 21	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	AFW pump feeds 23/24 SGs and can provide sufficient AFW flow for cooldown	
	• PO trips and stops 23 AFW pump	
	• CRS dispatches and NEO to close 21MS45	
	• CRS dispatches an operator to close 2SS321	
	• PO determines 21 SG is isolated from intact SGs and feed flow should remain isolated	
	• RO determines 2PR6 is closed with power removed	
REMOTES - PR34D to UNTAGGED, 3 mins after requested	• CRS directs power restored to 2PR6	
	• PO determines no SG is faulted	
	• CREW resets safeguards	
	• RO stops both RHR pumps	
	• PO evaluates 21 SG as greater than 375 and not faulted	
	• CRS dispatches operator to shift Gland seal supply to U1	
	• CREW determines target temperature is 503°F	
	• CREW commences rapid cooldown to target temperature	
CT# 3 (E-3 -B): Establish/maintain an RCS temperature so that a transition from SGTR-1 does not occur	• PO cools down at max rate using available MS10s	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
SAT ____ UNSAT____		
PO must set MS10s to insure RCS temperature is maintained below target to insure Subcooling during coming depressurization	• PO stops cooldown when target temperature is reached and dumps steam to stabilize temp	
CT# 4 (E-3 --C): Depressurize RCS until Ruptured SG and RCS pressure are equal and PZR level is ≥ 11% with Subcooling >0, before water release from ruptured SGPORV or Safety valve **SAT ____ UNSAT____**	• Crew determines normal spray is not available and depressurizes using 2PR2 • RO terminates depressurization when criteria of table F is met	
	• CREW terminates SI	
Evaluator Note: ECG Classification is ALERT IAW EAL 3.2.3.a. SW bay leak is a UE EAL 9.7.1. This should NOT be upgraded to 9.7.2 with 2B EDG tagged, as 2nd train of SW is not affected by the flood.		
Terminate scenario when Depressurization is complete or at discretion of lead evaluator		

VI. SCENARIO REFERENCES

A. Alarm Response Procedures (Various)
B. Technical Specifications
C. Emergency Plan (ECG)
D. SC.OP-AP.ZZ-0102(Q), Use of Procedures
E. S2.OP-SO.TD-0001 - Bleed Steam Coil Drain Tank And Heater Drain Pump Operation
F. S2.OP-SO.CVC-0006 – Boron Concentration Control
G. S2.OP-IO.ZZ-0004 – Power Operation
H. S2.OP-AB.PZR-0001 – Pressurizer Pressure Malfunction
I. S2.OP-SO.RPS-0003 – Removing a Pressurizer Channel from Service
J. S2.OP-AB.SW-0001 – Loss of Service Water Header Pressure
K. S2.OP-AB.SW-0003 – Service Water Bay Leak
L. S2.OP-AB.SG-0001 – Steam Generator Tube Leak
M. 2-EOP-TRIP-1 - Reactor Trip or Safety Injection
N. 2-EOP-SGTR-1 – Steam Generator Tube Rupture

VII. ESG CRITICAL TASK RATIONAL

CT#1 (E-3 --A): Close 21AF11 and 21 within 10 min on identification of fault and complete isolation of Ruptured Steam Generator

Basis Failure to isolate the ruptured SG causes a loss of differential pressure between the ruptured SG and intact SGs. Upon loss of differential pressure the crew must transition to a contingency procedure that "necessitates the crew taking compensating action that complicates the event mitigation strategy..."

For feedwater, isolation must occur after ruptured SG level exceeds minimum indication (9%)...Any delay in the AFW isolation allows the ruptured SG level to increase as the AFW adds additional inventory along with the primary to secondary leakage. Too long a delay (>10 min) prevents the crew from depressurizing and terminating SI before excessive inventory seriously damages the SG as a fission product barrier.

CT#2 (E-0 --L): Manually start and align the minimum ESW pumps in an operating safeguard train

Basis Failure to manually start and align the minimum required number of ESW pumps in an operating safeguards train represents a "demonstrated inability by the crew to:

- Recognize a failure/incorrect auto actuation of and ESF system or component
- Effectively direct/manipulate ESF controls."

CT#3 (E-3 --B) Establish/maintain an RCS temperature so that a transition from SGTR-1 does not occur

Basis Failure to establish and maintain correct RCS temperature during a SGTR leads to a transition from SGTR-1 to a contingency procedure, which constitutes an incorrect performance that "necessitates the crew taking compensating action that complicates the event mitigation strategy..."

CT# 4 (E-3 --C) Depressurize RCS until Ruptured SG and RCS pressure are equal and PZR level is $\geq$ 11% with Subcooling >0, before water release from ruptured SG PORV or Safety valve

Basis Failure to stop reactor coolant leakage into a ruptured SG by depressurizing the RCS needlessly complicates mitigation of the event. It also constitutes a "significant reduction of safety margin beyond that irreparably introduced by the scenario

VIII. ESG - PSA RELATIONSHIP EVALUATION

S-ILT-2006 NRC ESG-1
SALEM ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

Y/N	EVENT	Y/N	EVENT
N	TRANSIENTS with PCS Unavailable	N	Loss of Service Water
Y	Steam Generator Tube Rupture	N	Loss of CCW
Y	Loss of Offsite Power	N	Loss of Control Air
N	Loss of Switchgear and Pen Area Ventilation	N	Station Black Out
N	LOCA		

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

Y/N	COMPONENT, SYSTEM, OR TRAIN	Y/N	COMPONENT, SYSTEM, OR TRAIN
N	Containment Sump Strainers	N	Gas Turbine
Y	SSWS Valves to Turbine Generator Area	Y	Any Diesel Generator
N	RHR Suction Line valves from Hot Leg	N	Auxiliary Feed Pump
N	CVCS Letdown line Control and Isolation Valves	N	SBO Air Compressor

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

Y/N	OPERATOR ACTION
N	Restore AC power during SBO
N	Connect to gas turbine
N	Trip Reactor and RCPs after loss of component cooling system
N	Re-align RHR system for re-circulation
Y	Un-isolate the available CCW Heat Exchanger
N	Isolate the CVCS letdown path and transfer charging suction to RWST
Y	Cooldown the RCS and depressurize the system
Y	Isolate the affected Steam generator which has the tube ruptures
Y	Early depressurize RCS
N	Initiate feed and bleed

Complete this evaluation form for each ESG.

UNIT TWO PLANT STATUS TODAY

MODE:	1	POWER:	100	RCS BORON:	731	MWe:	1200

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED):

N/A

REACTIVITY PARAMETERS

Core Burn-up 10,500 MWD/MTU, reactivity plan provided by reactor engineering

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

3.8.1.1.b action b. 2B diesel C/T

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

Shutdown to 90% at 30% per hour to support removal of 22 heater drain pump from service

ABNORMAL PLANT CONFIGURATIONS:

CONTROL ROOM:

Unit 1 and Hope Creek at 100% power.
No penalty minutes in the last 24 hrs.

PRIMARY:

NONE

SECONDARY:

Heating steam is aligned to unit 1.

RADWASTE:

No discharges in progress

CIRCULATING WATER/SERVICE WATER:

X. SIMULATOR ESG REVIEW/VALIDATION CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

EXAMINATION SCENARIO GUIDE (ESG) REVIEW/ VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK **ESG-** "I" ILT NRC-ESG-001 **REVIEWER:** Ed Gallagher

____ 1. **THE SCENARIO HAS CLEARLY STATED OBJECTIVES IN THE SCENARIO.**

____ 2. The initial conditions are realistic, equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

____ 3. Each event description consists of:
- The point in the scenario when it is to be initiated,
- The malfunction(s) that are entered to initiate the event,
- The symptoms/cues that will be visible to the crew,
- The expected operator actions (by shift position), and
- The event termination point.

____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

____ 5. The events are valid with regard to physics and thermodynamics.

____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

____ 8. If time compression techniques are used, scenario summary clearly so indicates.

____ 9. The simulator modeling is not altered.

____ 10. All crew competencies can be evaluated.

____ 11. Appropriate reference materials are available (SOERs, LERs, etc.).

____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

____ 13. Proper critical task methodology is used IAW NRC procedures.

____ 14. ESG-PSA Evaluation Form is completed for the scenario at the applicable facility.

ATTACHMENT 1
SIMULATOR READY-FOR-TRAINING CHECKLIST

_____ 1. Verify simulator is in correct load for training

_____ 2. All required computer terminals in operation

_____ 3. Simulator clocks synchronized

_____ 4. Required chart recorders advanced and ON (proper paper installed)

_____ 5. Rod step counters correct (channel check)

_____ 6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____ 7. DL-10 log up-to-date

_____ 8. Required procedures clean

_____ 9. All OHA lamps operating (OHA Test)

_____ 10. All printers have adequate paper AND functional ribbon

_____ 11. Procedure pens available

_____ 12. Procedures in progress open and signed-off to proper step

_____ 13. Shift manning sheet available

_____ 14. SPDS reset

_____ 15. Reference verification performed with required documents available

_____ 16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____ 17. Required keys available

_____ 18. Video Tape (if applicable)

_____ 19. Ensure ECG Classification is correct - - 960502140 CRCA-03

_____ 20. Reset P-250 Rod Counters

ATTACHMENT 2
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgment of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

I. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

- degradation of any barrier to fission product release
- degraded emergency core cooling system (ECCS) or emergency power capacity
- a violation of a safety limit
- a violation of the facility license condition
- incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
- a significant reduction of safety margin beyond that irreparably introduced by the scenario

A. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

- effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
- recognize a failure or an incorrect automatic actuation of an ESF system or component.
- take one or more actions that would prevent a challenge to plant safety.
- prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) or ESF actuation.

ATTACHMENT 3

ESG PRE-JOB BRIEF CHECKLIST

EXAMINATION SCENARIO GUIDE (ESG) Pre-Job Brief Checklist

Note: This checklist is to be completed by the Lead Examiner prior to evaluating an ESG. The Lead Examiner should lead a pre-job brief with all the examiners and simulator operators that includes, but is not limited to the following:

ESG: "I" ILT NRC-ESG-001 Lead Examiner: _____

____ 1.ESG overview and sequence of major events.

____ 2.Determine which optional events will be performed, if any.

____ 3.ESG summary of Critical Tasks.

____ 4.Assign examiners to observe specific watch standers.

____ 5.Assign examiner ownership for observing and documenting performance / non-performance of Critical Tasks.

____ 6.Review alternate path(s) identified by the ESG.

____ 7.Assign examiner to document data related to the performance of Critical Tasks.

____ 8.Determines what parameters will be recorded in "Data Collection."

Ensure SOE recorder is recording.

SIMULATOR EXAMINATION SCENARIO

SCENARIO TITLE: LOCA

SCENARIO NUMBER: I ILT NRC ESG-002

EFFECTIVE DATE: 12/4/6

EXPECTED DURATION: 1.5 hours

REVISION NUMBER: 00

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **STA**

[ ] **OTHER** _____

Revision Summary:

Rev 0: New Issue for I ILT NRC exam

PREPARED BY:	Paul Williams **(INSTRUCTOR)**	10/9/06 **(DATE)**
APPROVED BY:	_____ **(OPERATIONS TRAINNG MANAGER OR DESIGNEE)**	_____ **(DATE)**
APPROVED BY:	_____ **(OPERATIONS MANAGER OR DESIGNEE)**	_____ **(DATE)**

I. OBJECTIVES

Enabling Objectives

A. Given the unit in a start-up condition and the need to raise power, raise power to 18-20%, IAW approved station procedures.

B. Given the unit at power with a loss of tripping capability on a reactor trip breaker, the crew will validate the alarm, IAW approved station procedures.

C. Given the unit with a trip of the running charging pump, the crew will place another pump in service, IAW approved station procedures.

D. Given the unit at power with a partial loss of off-site power, the crew will take actions to stabilize the unit, IAW approved station procedures.

E. Given the unit with a LOCA in progress, the crew will take corrective actions to mitigate the accident, IAW approved station procedures.

F. Given the unit with a total loss of off-site power and a LOCA in progress, the crew will take actions to restore safeguards equipment, IAW approved station procedures.

II. MAJOR EVENTS

A. Raise power to place Turbine on Line

B. Loss of Tripping Capability on RTB "B"

C. 23 CV Pump Trip

D. Loss of 3 SPT

E. Small Break LOCA

F. Loss of Off-Site Power

III. SCENARIO SUMMARY

A. The crew will receive the unit at 4.5% power returning from a forced outage to repair Digital EHC problems. All approvals and surveillances are complete and approval to proceed to mode 1 has been given. Order to the shift is to raise power to 18% in preparation for placing turbine on line.

B. After the power ascension is in progress an electrical malfunction will cause the A Reactor Trip breaker to lose 125V DC causing the loss of Shunt trip capability. The CRS will evaluate the operability of the trip breaker and enter the tech spec action statement.

C. After the tech spec is entered the in service charging pump will trip additionally the letdown orifice isolation valve will fail partially open. The crew will isolate letdown and place a standby charging pump in service IAW AB.CV-0001. Once charging is restored excess letdown will be placed in service.

D. After excess letdown is in service 3 station power transformer will trip. This will cause a loss of 2 group busses and RCPs. No auto trip signal will occur at <P-10. The crew will enter AB.LOOP-0003, which will direct a Reactor Trip.

E. After the crew has transitioned to EOP-TRIP-2, a LOCA will occur and Auto SI initiation will fail. The crew will manually initiate SI and re-enter the EOP network.

F. After the crew has progressed to EOP-LOCA-1 and reset safeguards a loss of Off-site power will occur. The crew will reset the SECs and load the ECCS equipment required for the LOCA conditions. The scenario will end after safeguard loads are started.

IV. INITIAL CONDITIONS

____ Presnapped IC-192 from Exam Drive

MALFUNCTIONS:

SELF-CHECK		Description	Delay	Ramp	Trigger	Severity
____	1.	CV0034 23 Charging Pump Trip	NA	NA	ET-2	
____	2.	VL0245 2CV4 Fails to Position	NA	NA	ET-2	50
____	3.	EL0102 Loss of 3 SPT-Diff	NA	NA	ET-3	
____	4.	RC0002 RCS Leak into Containment	NA	NA	ET-4	10000
____	5.	EL0134 Loss of Off-Site Power	NA	NA	ET-5	
____	6.	RP0108 Failure of Automatic SI	NA	NA	NA	NA
____	7.	RP0342 2SJ12 Fails to Open on SEC act	NA	NA	NA	NA
____	8.	RP0343 2SJ13 Fails to Open on SEC act	NA	NA	NA	NA
____	9.	AN0183 E37 Ch C Shutdown Margin	NA	NA	NA	1
____	10.	AN0191 E45 Ch D Shutdown Margin	NA	NA	NA	1

REMOTES:

SELF-CHECK		Description	Delay	Ramp	Trigger	Condition
____	1.	MC12D Loss of Tripping Capability RTB "A"	NA	NA	ET-1	Alarm
____	2.	CV42A Minimum Flow Stop for 2CV55	NA	NA	ET-10	0
____	3.	MT03D Main Turb Turning Gear PB	NA	NA	NA	Dep PB
____	4.	DA033D DC breaker #14 A RX Trip Brkr	NA	NA	ET-1	Off

OVERRIDES:

SELF-CHECK		Description	Delay	Ramp	Trigger	Action
____	1.	None				

EVENT TRIGGERS:			
SELF-CHECK	ET#n	Discription	Command

____ 1. None

TAGGED EQUIPMENT:	
	Description

____ 1. RH1 and RH2
____ 2. VC 1-4
____ 3. RH 18's
____ 4. RCPs (SELF CHECK)
____ 5. RT (SELF CHECK)
____ 6. MS 167s (SELF CHECK)
____ 7. 500 KV SWYD (SELF CHECK).
____ 8. 22 ABV Supply Fan
____ 9. 23 CV Pump (SELF CHECK)

OTHER CONDITIONS	
	Description

____ 1. IOP-3 signed off thru step 5.4.14

V. SEQUENCE OF EVENTS

A. State shift job assignments:

B. Hold a shift briefing, detailing instruction to the shift: (provide CREW members a copy of the shift turnover sheet)

C. Inform the crew "The simulator is running. You may commence panel walkdowns at this time. CRS please inform me when your crew is ready to assume the shift".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

E. Do not review objectives with crew

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
1. Power Increase		
Crew will receive the watch at 4.5% power with direction to raise power in preparation to place the main turbine on line. IOP-3 is signed off thru step 5.4.14	• CRS briefs crew on power increase • RO withdraws rods to raise reactor power • PO adjusts steam dumps to increase steam load and maintain Tavg on program	
Proceed to next event when power reduction has progressed to the satisfaction of the Lead examiner but before 10% power		
1. Loss of Tripping Capability on "A" RTB		
Insert ET-1 at the direction of the Lead evaluator	• RO reports alarm to CRS • CRS directs ROs to hold power increase • PO reviews ARP and informs CRS • CRS directs NEO to check 125VDC breaker	
3 mins after request to check breaker inform CRS breaker is closed	• CRS enters TSAS 3.3.1.1 act 14	
Proceed to next event after TSAS determination or when directed by Lead Evaluator		

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

2. 23 CV Pump Trip

Enter ET-2 when directed by lead evaluator

- RO responds to loss of seal injection flow console alarms, identifies 23 Charging Pump trip
- CRS enters AB-CVC-1
- Crew determines pump did not trip due to cavitation
- RO closes 2CV2 and 2CV277
- RO informs CRS that CV4 did not close fully
- CRS directs RO to attempt to close CV4 and RO reports that CV4 did not close
- CRS directs letdown isolated using the 2CV2 and 2CV277 to prevent flashing the Letdown Line
- Crew determines 23 CV pump not available
- CRS directs start of 21 or 22 Charging Pump IAW AB.CVC-1
- RO shifts CV55 to Manual CLOSED, starts a CCP
- CRS directs NEO to investigate cause of 23 Charging pump trip
- CRS directs Excess Letdown reestablished IAW SO.CVC-0003

To place CV55 in Bypass REMOTES CV47A to 0.0

- RO establishes excess letdown
- CRS directs CV7 to be closed to isolate

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	penetration	
Proceed to next event when TSAS is determined	• CRS enters TSAS 3.6.3 and contacts WCC to prepare a tagout for CV7	
3. 3 SPT Trip, SB LOCA		
Insert ET-3 on cue from Lead Evaluator.	• Crew acknowledges multiple OH and console alarms • PO informs CRS that 21 CN pump and 21 SGFP have tripped and AFW has started and is feeding the SGs	
CRS must prioritize multiple problems including loss of main feed, steam dumps and 2 group busses and their respective RCPs. The CRS may order a Reactor trip at this time due to loss of 2 RCPs or cycling of MS dumps. CRS may also enter AB.CN or AB.CW neither will direct a Reactor Trip at <P10	• CRS enters AB.LOOP-0003 • CRS initiates CAS of LOOP-3 • PO informs CRS that all vital buses are energized by off-site power • CRS directs WCC to coordinate opening 500KV disconnects	
CAS of LOOP-3 directs implementing Attachment 2, Part A. This attachment directs opening of the Reactor Trip breakers	• Crew initiates Attach 2, Part A of LOOP-3 for loss of 2E and 2H group busses • CRS directs a Reactor trip, enters Trip-1 requests assistance form WCC to continue with AB-LOOP-3 • RO initiates a MANUAL Rx trip	
INSTRUCTOR NOTE: Insert ET-4 after Crew transitions to TRIP-2, at RCS Temp Control Step (Step-5)	• RO performs TRIP-1 Immediate Actions, from memory: 1. Trip reactor, 2. Confirm reactor trip, 3. Trip turbine, 4. All 4 KV Vital Bus energized 5. SI Actuation not required • CRS enters TRIP-1 and reads Immed	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	Actions	
	• PO throttles AFW at completion of Immed actions	
	• CRS transitions to TRIP-2	
	• RO announces Reactor Trip	
	• PO throttles AFW	
	• RO reports rapidly lowering PZR pressure and level	
CT-1 (E-0 –D) Manually actuate at least 1 train of Safety Injection before transition to LOCA-1, any FR procedure or completion of step 9 of Trip-2 **SAT_____ UNSAT_____**	• RO initiates Safety Injection due to lowering Pressurizer Pressure	
	• CRS returns to Trip-1	
	• RO announces Rx Trip and Safety Injection and informs CRS that Auto SI failed to actuate	
Depending on timing of manual SI crew may not identify failure of Auto SI if manual is initiated prior to auto setpoint. SI setpoint occurs in approx 14 sec	• RO/PO performs SEC loading verification	
	• PO ensures 21 and 22 AFW pumps are running and throttles AFW flow to maintain Steam Generator level >9% or >22E4 lbm/hr feed flow.	
	• PO checks Safeguards Valve Alignment and identifies 2SJ12 and 2SJ13 not open	
	• CRS directs RO to open 2SJ12 and 13	
	• RO opens valves and informs CRS BIT flow now established	
	• RO closes 21/22CA330.	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• RO reports Containment Spray not required • RO determines MSLI isolation is not required • CREW closes CV139 and CV140 when RCS pressure is below 1500 psig with BIT Flow established	
CT #2 (E-1-C) Trip all RCPs prior to RCS inventory becoming depleted to critical inventory. (Within 5 mins of RCS pressure < 1350 with ECCS flow) **SAT_____ UNSAT_____**	• CREW secures remaining RCPs when RCS pressure is < 1350 with ECCS flow established	
Instructor note: RCPs must be stopped regardless of BIT flow, ECCS flow is established via the SI pumps	• PO verifies all 4KV vital busses energized • RO reports Control Room Ventilation in Pressurized Mode • RO reports proper Switchgear Room Ventilation lineup. • RO reports 2 CCW pumps running • RO evaluates ECCS flow alignment. • RO/PO verifies AFW flow >22E04 lbm/hr or SG level >9%. • Crew verifies RCS temperature control. • RO/PO verifies reactor trip breakers open. • RO verifies PORVs closed and stop	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	valves open	
	• CREW identifies PZR Sprays not available and RCPs secured.	
	• PO verifies no faulted SGs.	
	• PO verifies no SGTRs exist.	
	• RO/PO perform LOCA evaluation	
	• CREW transitions to LOCA-1.	
Depending on timing of scenario Containment spray may occur while the crew is in TRIP-1 or LOCA-1 and a purple path transition to FRCE may occur	• Crew performs verifications of FRCE-1 and return to LOCA-1 (Only of Purple path is met)	
	• PO verifies no faulted SGs.	
	• PO maintains SG levels	
	• PO verifies no ruptured SGs.	

	• RO/PO resets Safeguards:
	  • Resets SI;
	  • Resets Phase A;
	  • Resets Phase B;
	  • Opens 21 & 22CA330;
	  • Resets each SEC; and
	  • Resets 230V Control Centers.	

	• Crew evaluates SI flow reduction criteria	
Depending on timing of scenario RHR pumps may be stopped if RCS pressure has stabilized.	• CRS determines spray pumps and RHR pumps should not be stopped	
	• PO stops unloaded diesels	
5. Loss of Off-Site Power **Insert ET-5 after 230V Control Centers are reset, or at Lead Evaluator's discretion.**	• CRS refers to Step 5 Continuous Action "IF Blackout occurs…"	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• Crew performs actions of Table B of LOCA-1 • RO/PO verifies SEC loading complete • PO resets all SECs.	
Crew may decide not to start RHR pumps if they were previously stopped, RHR pumps are not required at this pressure	• CRS directs restart of available Safeguards loads: o 21 and 22 Charging Pump o 21/22 SI Pump; o 21-25 CFCU in slow speed; o Switchgear Room Exhaust Fans o Containment Spray pumps (If required)	
CT #3 (E-0-J) Start at least one Safety Injection Pump (Intermediate Head) prior to step 14 of LOCA-1 or prior to step 6 of FRCC-2. **SAT____ UNSAT**		
Evaluator Note: ECG classification is Alert EAL 3.2.2.b		
Terminate scenario at the completion of the equipment restart or lead evaluators discretion		

VI. SCENARIO REFERENCES

A. Alarm Response Procedures (Various)

B. Technical Specifications

C. SC.OP-AP.ZZ-0102(Q), Use of Procedures

D. S2.OP-AB.CVC-0001 – Charging System Malfunction

E. S2.OP-AB.LOOP-0003 – Partial Loss of Off-Site Power

F. EOP-TRIP-1 – Reactor Trip or Safety Injection

G. EOP-TRIP-2 – Reactor Trip Response

H. EOP-LOCA-1 – Loss of Coolant

I. EOP-FRCE-1 –Response to Excessive Containment Pressure

VII. ESG CRITICAL TASK RATIONAL

CT-1 (E-0 –D): Manually actuate at least 1 train of Safety Injection before transition to any LOCA, or FR procedure or completion of step 9 of Trip-2.

BASIS: Failure to manually actuate SI under postulated conditions constitutes "mis-operation or incorrect crew performance that leads to degraded ECCS capacity" Additionally, failure to manually actuate SI (when it is possible to do so) results in a "significant reduction in safety margin beyond that irreparably introduced by the scenario." Finally, failure to manually actuate SI is a "violation of the facility license condition"

CT #2 (E-1-C): Trip all RCPs prior to RCS inventory becoming depleted to critical inventory. (within 5 mins of RCS pressure < 1350 with ECCS flow)

BASIS: Failure to trip the RCPs under the postulated plant conditions leads to core uncovery and to fuel cladding temperatures in excess of 2200°. Thus, failure to perform the task represents "mis-operation or incorrect crew performance which leads to the degradation of a barrier to fission product release.

WOG sponsored analysis to demonstrate that the operating crew would have sufficient time (from the point at which the criteria was met) to recognize the indications that the criteria are met and trip RCPs before the window for adverse consequence begins…The minimum response time for the operating crew is 5 minutes… if the RCPs are tripped within 5 minutes of the trip criteria being met, PCT remains below 2200

CT#3: Re-establish plant design basis conditions by starting at least one train of ECCS equipment after a loss of off-site power occurs with SI Reset.

BASIS: FSAR assumption of minimum ECCS flow per section 15.3.1.2.

VIII. ESG - PSA RELATIONSHIP EVALUATION

I ILT NRC #2
SALEM ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

Y/N	EVENT	Y/N	EVENT
N	TRANSIENTS with PCS Unavailable	N	Loss of Service Water
N	Steam Generator Tube Rupture	N	Loss of CCW
Y	Loss of Offsite Power	N	Loss of Control Air
N	Loss of Switchgear and Pen Area Ventilation	N	Station Black Out
Y	LOCA		

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

Y/N	COMPONENT, SYSTEM, OR TRAIN	Y/N	COMPONENT, SYSTEM, OR TRAIN
N	Containment Sump Strainers	N	Gas Turbine
N	SSWS Valves to Turbine Generator Area	N	Any Diesel Generator
N	RHR Suction Line valves from Hot Leg	N	Auxiliary Feed Pump
Y	CVCS Letdown line Control and Isolation Valves	N	SBO Air Compressor

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

Y/N	OPERATOR ACTION
N	Restore AC power during SBO
N	Connect to gas turbine
N	Trip Reactor and RCPs after loss of component cooling system
N	Re-align RHR system for re-circulation
N	Un-isolate the available CCW Heat Exchanger
N	Isolate the CVCS letdown path and transfer charging suction to RWST
N	Cooldown the RCS and depressurize the system
N	Isolate the affected Steam generator which has the tube ruptures
N	Early depressurize RCS
N	Initiate feed and bleed

Complete this evaluation form for each ESG.

UNIT TWO PLANT STATUS TODAY

MODE:	1	POWER:	4.2	RCS BORON:	607	MWe: 0

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED):

N/A

REACTIVITY PARAMETERS

Core Burn-up 17,500 MWD/MTU, reactivity plan provided by reactor engineering is for initial power increase to 20% to be performed with control rods. Detailed plan for continued power ascension will be provide after Turbine is on line.

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

Increase power to 18% in preparation for placing the main turbine on line. IOP-3 is complete thru step 5.4.14 and all approvals and surveillances for transition to Mode 1 are complete.

ABNORMAL PLANT CONFIGURATIONS:

CONTROL ROOM:

Unit 1 and Hope Creek at 100% power.
No penalty minutes in the last 24 hrs.

PRIMARY:

NONE

SECONDARY:

Heating steam is aligned to unit 1.

RADWASTE:

No discharges in progress

CIRCULATING WATER/SERVICE WATER:

X. SIMULATOR ESG REVIEW/VALIDATION CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

EXAMINATION SCENARIO GUIDE (ESG) REVIEW/ VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK **ESG-** "I" ILT NRC-ESG-002 **REVIEWER:** Ed Gallagher

____ 1. **THE SCENARIO HAS CLEARLY STATED OBJECTIVES IN THE SCENARIO.**

____ 2. The initial conditions are realistic, equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

____ 3. Each event description consists of:
- The point in the scenario when it is to be initiated,
- The malfunction(s) that are entered to initiate the event,
- The symptoms/cues that will be visible to the crew,
- The expected operator actions (by shift position), and
- The event termination point.

____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

____ 5. The events are valid with regard to physics and thermodynamics.

____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

____ 8. If time compression techniques are used, scenario summary clearly so indicates.

____ 9. The simulator modeling is not altered.

____ 10. All crew competencies can be evaluated.

____ 11. Appropriate reference materials are available (SOERs, LERs, etc.).

____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

____ 13. Proper critical task methodology is used IAW NRC procedures.

____ 14. ESG-PSA Evaluation Form is completed for the scenario at the applicable facility.

ATTACHMENT 1
SIMULATOR READY-FOR-TRAINING CHECKLIST

_____ 1. Verify simulator is in correct load for training

_____ 2. All required computer terminals in operation

_____ 3. Simulator clocks synchronized

_____ 4. Required chart recorders advanced and ON (proper paper installed)

_____ 5. Rod step counters correct (channel check)

_____ 6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____ 7. DL-10 log up-to-date

_____ 8. Required procedures clean

_____ 9. All OHA lamps operating (OHA Test)

_____ 10. All printers have adequate paper AND functional ribbon

_____ 11. Procedure pens available

_____ 12. Procedures in progress open and signed-off to proper step

_____ 13. Shift manning sheet available

_____ 14. SPDS reset

_____ 15. Reference verification performed with required documents available

_____ 16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____ 17. Required keys available

_____ 18. Video Tape (if applicable)

_____ 19. Ensure ECG Classification is correct - - 960502140 CRCA-03

_____ 20. Reset P-250 Rod Counters

ATTACHMENT 2
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgment of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

I. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

- degradation of any barrier to fission product release
- degraded emergency core cooling system (ECCS) or emergency power capacity
- a violation of a safety limit
- a violation of the facility license condition
- incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
- a significant reduction of safety margin beyond that irreparably introduced by the scenario

A. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

- effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
- recognize a failure or an incorrect automatic actuation of an ESF system or component.
- take one or more actions that would prevent a challenge to plant safety.
- prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) or ESF actuation.

ATTACHMENT 3

ESG PRE-JOB BRIEF CHECKLIST

EXAMINATION SCENARIO GUIDE (ESG) Pre-Job Brief Checklist

Note: This checklist is to be completed by the Lead Examiner prior to evaluating an ESG. The Lead Examiner should lead a pre-job brief with all the examiners and simulator operators that includes, but is not limited to the following:

ESG: "I" ILT NRC-ESG-001 Lead Examiner: _____

____ 1.ESG overview and sequence of major events.

____ 2.Determine which optional events will be performed, if any.

____ 3.ESG summary of Critical Tasks.

____ 4.Assign examiners to observe specific watch standers.

____ 5.Assign examiner ownership for observing and documenting performance / non-performance of Critical Tasks.

____ 6.Review alternate path(s) identified by the ESG.

____ 7.Assign examiner to document data related to the performance of Critical Tasks.

____ 8.Determines what parameters will be recorded in "Data Collection."

Ensure SOE recorder is recording.

SIMULATOR EXAMINATION SCENARIO

SCENARIO TITLE: Loss of Heat Sink

SCENARIO NUMBER: I ILT NRC ESG-003

EFFECTIVE DATE: 12/4/6

EXPECTED DURATION: 1.5 hours

REVISION NUMBER: 00

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **STA**

[ ] **OTHER** _____

Revision Summary:

Rev 0: New Issue for I ILT NRC exam

PREPARED BY:	Paul Williams **(INSTRUCTOR)**	10/9/06 **(DATE)**
APPROVED BY:	_____ **(OPERATIONS TRAINNG MANAGER OR DESIGNEE)**	_____ **(DATE)**
APPROVED BY:	_____ **(OPERATIONS MANAGER OR DESIGNEE)**	_____ **(DATE)**

I. OBJECTIVES

Enabling Objectives

A. Given the unit at power, with a sustained excessive U2 Main Power Transformer DC Ground Current, the crew will reduce power as required, IAW approved station procedures.

B. Given the unit at power with a Thot Failure, the crew will place rods in manual and stabilize the plant, IAW approved station procedures.

C. Given the unit at power with a leak in the CCW system, the crew will identify and isolate the leak, IAW approved station procedures.

D. Given a situation with an OHA alarm, perform action(s) to investigate and correct the cause of the alarm, IAW approved station procedures.

E. Given the unit with a loss of heat sink condition, the crew will restore feedwater, IAW approved station procedures.

II. MAJOR EVENTS

A. Abnormal Grid

B. 22 Loop Tavg fails as is

C. CCW Leak

D. Main Power Transformer Failure

E. Loss of Heat Sink

III. SCENARIO SUMMARY

A. The crew takes the watch at 100% power. 21 AFW Pump is tagged for bearing replacement.

B. Once the crew assumes the watch the DC neutral ground current will rise to 25 amps. The crew will enter AB.GRID-0001 and reduce power to 942 MWe. During the power reduction 22 Loop Tavg will fail as is resulting in excessive rod motion. The crew will enter AB.ROD-0003 and remove the channel from service.

C. After the channel is removed from service, a leak develops in the CCW system. The crew should implement AB.CC-0001 to establish makeup flow and isolate the leak.

D. Following isolation of the CCW leak, an OHA alarm comes in on MPT Phase 1. The NEO will report a major oil leak on the MPT and a desire to leave the area because of electrical arcing noises. The CRS should order a manual reactor trip.

E. The Turbine fails to trip on the reactor trip and MSLI fails to auto initiate. The crew should initiate a MSLI as part of immediate actions of EOP-TRIP-1. Safety Injection will occur based on the high steam flow.

F. 23 AFWP trips when it auto starts and is not able to be reset. After AFW flow is throttled to 22e4, 22 AFWP breaker trips open. The crew should transition to FRHS-1 when the RED PATH conditions are met. In FRHS-1, the crew should stop the RCPs; select 1 SG for depressurization to allow feed using a Condensate pump.

G. The Lead Evaluator can terminate the scenario any time after S/G WR level is observed rising.

H. **NOTE:** Depending on timing of the MSLI and progress through the procedures, RCS Bleed and Feed criteria may be met before the Condensate pump is feeding the S/G. In that case, the crew will initiate RCS Bleed and Feed then feed the S/Gs via a Condensate Pump.

IV. INITIAL CONDITIONS

____ Pre-snapped IC-193 from portable exam drive

MALFUNCTIONS:

SELF-CHECK	Description	Delay	Ramp	Trigger	Severity
____ 1.	RP0069 MN Turb Trip Internal Vlv Fail	N/A	N/A	N/A	N/A
____ 2.	RP0073 MN Turb Trip Failures Various	N/A	N/A	N/A	4
____ 3.	RP0279A Auto MSLI Fails to ACT Trn A	N/A	N/A	N/A	N/A
____ 4.	RP0279B Auto MSLI Fails to ACT Trn B	N/A	N/A	N/A	N/A
____ 5.	AF0183, 23 Aux FW Pmp Overspeed Trip	N/A	N/A	NA	NA
____ 6.	RC0014B 22 Loop Tavg	2:00	NA	ET-1	As-Is
____ 7.	CC0329 CC Leak at 21 Safety Rel Header	N/A	1:00	ET-2	30
____ 8.	AN0529, SER 529:H15 MPT Sud Press	N/A	N/A	ET-3	On
____ 9.	AF0181B, 22 Aux Feedwater Pump Trip	N/A	N/A	ET-4	True
____ 10.	VL0464-467 21-24BF40 Fails (as directed)	NA	NA	NA	100

REMOTES:

SELF-CHECK	Description	Delay	Ramp	Trigger	Condition
____ 1.	AF20D, 21 AFW Pump Bkr Control Power	N/A	N/A	N/A	Off
____ 2.	AF21D, 21 AF Pump Rack Out	N/A	N/A	N/A	Tagged
____ 3.	EL12A DC Neutral Ground Current	NA	2:00	ET-1	25

OVERRIDES:

SELF-CHECK	Description	Delay	Ramp	Trigger	Action
____ 1.	OVDI MSLI CH A Loop 1	NA	NA	NA	Off
____ 2.	OVDI MSLI CH A Loop 2	NA	NA	NA	Off
____ 3.	OVDI MSLI CH A Loop 3	NA	NA	NA	Off
____ 4.	OVDI MSLI CH A Loop 4	NA	NA	NA	Off
____ 5.	OVDI MSLI CH B Loop 1	NA	NA	NA	Off
____ 6.	OVDI MSLI CH B Loop 2	NA	NA	NA	Off

____	7.	OVDI MSLI CH B Loop 3	NA	NA	NA	Off
____	8.	OVDI MSLI CH B Loop 4	NA	NA	NA	Off

EVENT TRIGGERS:

SELF-CHECK	ET#n	Description	Command
____ 1.		None	

TAGGED EQUIPMENT:

	Description
____ 1.	RH1 and RH2
____ 2.	VC 1-4
____ 3.	RH 18's
____ 4.	RCPs (SELF CHECK)
____ 5.	RT (SELF CHECK)
____ 6.	MS 167s (SELF CHECK)
____ 7.	500 KV SWYD (SELF CHECK).
____ 8.	22 ABV Supply Fan
____ 9.	23 CV Pump (SELF CHECK)
____ **10.**	**21 AFW Pump (C/T)**

OTHER CONDITIONS:

	Description
____ 1.	None

V. SEQUENCE OF EVENTS

A. State shift job assignments:

B. Hold a shift briefing, detailing instruction to the shift: (provide CREW members a copy of the shift turnover sheet)

C. Inform the crew "The simulator is running. You may commence panel walkdowns at this time. CRS please inform me when your crew is ready to assume the shift".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

E. Do not review objectives with crew

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

1. Abnormal Grid

Enter ET-1 EL12A to 25

- PO acknowledges OHA H-23, MPT ∅2 TRBL
- PO determines CRT point 545 is in alarm and refers to alarm response

INSTRUCTOR NOTE: 2 minutes after modifying the remote, call as the Electric Systems Operator (ESO) and inform the Crew that the SMD has been upgraded to K-8 for the next 6 hours.

- CREW dispatches NEO to MPT Phase 2 to investigate and correct alarm
- CREW monitors Computer point Y2107A and determines that MPT DC Ground Current is ≥15 amps
- PO informs CRS that MPT DC Ground Current is rising rapidly
- CREW determines that MPT DC Ground Current has been ≥ 17 amps for > 5 minutes.
- CRS enters S2.OP-AB.GRID-0001
- CREW initiates Attachment 1, Continuous Action Statements (CAS)
- CREW initiates Attachment 2, Solar Magnetic Disturbance.
- CREW holds brief discussing actions of AB.GRID-1 including reactivity and contingency actions
- CREW initiates a Generator Load reduction to <942 MW by:
  - PO selecting SMD #1 Runback of DEHC panel
  - PO selecting GO on DEHC panel
- CREW initiates S2.OP-AB.LOAD-0001
- CREW performs Continuous Actions

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	Summary (Attachment 1) of S2.OP-AB.LOAD-0001. • RO/PO maintain TAVG on program with rods, boration, or turbine load • RO energizes Pressurizer heaters • RO/PO initiates boration or Rapid Boration to maintain rods above RIL • CREW determines AFD is outside the target band and begins accumulation of penalty minutes.	
2. 21 loop Tavg fails As Is **Failure of 21 loop Thot will become evident during down power**	• RO informs CRS that rods are inserting in Auto, with Tave lowering further than expected also 21 Tavg channel is higher than the others	
Crew should determine that the Rod insertion limits are not valid alarms due to the failed Thot channel.	• RO reports OHA for Rod insertion limit Lo and LO LO.	
Depending on timing of 22 Loop Thot failure, crew may not enter AB-ROD-3 but may defeat the channel using console ARP. This will cause rods to withdraw rapidly when failed channel is removed from circuit	• CRS directs RO to place rods in manual • CRS enters S2.OP-AB.ROD-0003	**RO may request permission to place rods in manual prior to direction**
Proceed to next event when load is stable and level control has been returned to auto or at discretion of lead evaluator	• RO withdraws rods as required to control Tavg IAW Attachment 1 of S2.OP-AB.ROD-0003 • Crew identifies 21 loop Thot as failed • RO adjusts charging flow as required to restore PZR level to program • CRS directs RO to defeat failed channel	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• RO returns PZR level and Rod control to Automatic • CRS enters TSAS for 21 Loop Thot and requests assistance from I&C to remove channel from service TSAS 3.3.1.1 act 6, 3.3.2.1.b act 19	
3. CCW Leak		
Enter ET-2 at lead evaluator cue	• RO/PO report lowering level in CCW surge tank • PO refers to console ARP and initiates makeup to CCW surge tank • CREW enters AB.CC-001.	
CRS may enter the AB directly	• PO opens 2DR107 to makeup to the system and determines level can be maintained	
Role Play: ~2 minutes later, NEO reports CC145 is open, CC146 is closed.	• RO directs NEO to verity CC145 or CC146 open. • CRS directs NEOs to walkdown the system. • Crew monitors sumps and WHUTs • RO reports RHR sump pump run • CRS initiates attachment 4 for locating leak. • RO informs CRS 22CV pump not in service	
Role Play when 21 CC pump is stopped call as NEO and report: **Large leak on 21 CC pump mechanical seal appears to have lessened when the pump was stopped.** **Modify MALF: CC0339A from 30 to 5** **If asked: NEO states he can safely close pump isolation valves with reduced leak rate**	• PO places 2CC31 in manual and starts 23 CC pump then stops 21 CC pump • CRS returns to step 3.28 and refers to Attachment 3 for isolation of leak • CRS directs NEO to isolate pump by closing 21CC2 and 21CC19	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• CRS directs the WCC to have NEO de-energize control power for 21 CC pump to prevent auto start of isolated pump and requests tagging request for 21 CC pump.	
Remote CC21D to off then report as NEO: 125V DC control power for 21 CC pump is off **Delete MALF CC 0339A and report as NEO: 21CC2 and 21CC19 closed**	• CRS refers to Tech Specs and enter TSAS 3.7.3	
3. MPT PHASE I Failure		
Insert ET-3 when directed by Lead Evaluator	• CREW responds to OHA H-15	
Role Play: ~ 3 minutes after contacted, the NEO reports a major oil leak on the Main Power Transformer and the constant sound *of electrical arcing*.	• CREW implements OHA ARP and sends an NEO to investigate.	
4. Reactor Trip, Failure of Auto Turbine Trip, MSLI and Subsequent Loss of all Feedwater	• CRS orders a MANUAL Reactor trip based on MPT problem.	
Note: Trip of 23 AFW pump is pre-inserted. The pump will trip on overspeed when it starts.	• RO performs IA's for TRIP-1: 1) Trip Reactor. 2) Confirm Reactor trip. 3) Reports Turbine NOT Tripped. 4) Attempts Manual Turbine Trip 5) Attempts MSLI from safeguards bezel 6) Fast closes MS167s from CC3 7) Verifies 4kV Vital Bus energized. 8) Reports SI actuated.	
CT#1(E-0 –P): Manually accomplish MSLI before a severe challenge develops to either subcriticality or integrity CSF or transition to LOSC **SAT_____ UNSAT____**	• PO reports 23 AFW pump tripped	
	• PO report generator breakers did not open with turbine failing to trip	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• CRS directs generator breakers open	
Insert RT-4 on que from lead evaluator to trip 22 AFW pump	• PO throttles 21/22AF21 to 22e4 to minimize cooldown.	
	• PO reports trip of 22 AFW Pump and loss of all AFW capability	
Role Play: ~ 2 minutes after contacted, NEO reports the trip linkage is bent and the 23 pump cannot be reset request maintenance assistance	• CREW dispatches NEO to investigate loss of 22 and 23 AFW pumps	
Crew brief in TRIP-1 should be expedited due to degrading Heat Sink conditions	• CRS briefs crew on status and plan	
	• CREW transitions to FRHS-1 at step 20.1 of TRIP-1	
Evaluators: If RCS Bleed and Feed criteria are met before feed is initiated from the CN system, Crew should IMMEDIATLY go to Bleed and Feed at step 23 See Page 13 of this guide.	• CRS reviews Bleed and Feed criteria	
	• Crew determines Aux Feed Pumps are not available	
	• RO stops all RCPs.	
	• PO reports Condensate system is in operation	
	• Crew determines that SGFPs are not available due to SI actuation.	
This was previously performed in EOP-TRIP-1	• Crew verifies SI valve alignment.	
	• RO resets safeguards	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
24 SG should be selected for depressurization as its level will be less than 22 SG due to the delayed trip of 22 AFW pump	• Crew selects SG for depressurization • CRS reviews depressurization termination criteria	
Enter VI-464-467 to 100% as directed to open BF40	• PO reports Steam Dumps are NOT available (MSLI)	
CT#2A (FR-H.1-E): Establish minimum required feedwater flow rate to the S/Gs before S/G dryout. SAT_____ UNSAT_____	• PO fully opens selected MS10 • CRS dispatches an NEO to fully open selected BF40 • PO opens selected BF13 • PO releases selected BF22	
Depressurization of selected SG should not be stopped until WR level is rising in that SG (FF>SF)	• PO opens 21 and 22 CN48s and closes 21 and 22 CN32s	
The Scenario can be terminated at the Lead Evaluator's discretion, after S/G WR level is observed to be raising.		

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
USE this Section if RCS Bleed and Feed Initiation Criteria are met.	• CREW goes to Step 23 of FRHS-1. • RO stops RCPs.	
Crew may validate that SI is in service without re-initiating	• RO initiates SI. • RO verifies Charging pumps running and BIT flow established	
CT#2B (FR-H.1 --B): Establish RCS Bleed and Feed before PZR PORVs open due to loss of heat sink. **SAT____ UNSAT____**	• RO opens both PZR PORVs and PORV Stop Valves.	
If not previously completed	• CREW performs EOP-APPX-3. • RO/PO resets SI, Phase A, Phase B, opens 21 & 22CA330, resets each SEC and 230V Control Center. • At Step 35, CRS returns to Step 20 to align a Condensate Pump to feed at least one S/G.	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

	• CRS selects a S/G to be steamed.
	• RO depressurizes and maintains selected S/G < 575 psig using steam dumps or MS10.
	• PO positions selected S/G valves:
	  • BF13 open,
	  • BF19 or BF40 (local by NEO) open,
	  • BF22 open,
	  • 21 & 22 CN48 open, and
	  • closes 21 & 22 CN32.	

The Scenario can be terminated at the Lead Evaluator's discretion, after S/G WR level is observed to be raising.	• CREW establishes condensate flow to the selected S/G as evidenced by rising S/G WR level indication or lowering CETs.	

VI. SCENARIO REFERENCES

A. Alarm Response Procedures (Various)
B. Technical Specifications
C. SC.OP-AP.ZZ-0102(Q), Use of Procedures
D. S2.OP-AB.GRID-0001 – Abnormal Grid
E. S2.OP-AB.ROD-0003 – Continuous Rod Motion
A. S2.OP-AB.CC-0001 – Component Cooling Abnormality
B. 2-EOP-TRIP-1, Reactor Trip or Safety Injection
C. 2-EOP-FRHS-1 – Loss of Heat Sink
D. 2-EOP-APPX-3 – SI Verification

VII. ESG CRITICAL TASK RATIONAL

CT#1(E-0 –P) Manually initiate MSLI before a severe challenge develops to either subcriticality or Integrity CSF or transition to LOSC

BASIS: Failure to close the MSIVs under the postulated plant conditions causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Additionally, such an omission constitutes a "demonstrated inability by the crew to recognize a failure of the auto actuation of an ESF system or component and to take action that would prevent a challenge to plant safety."

CT#2A (FR-H.1-A) Establish feedwater flow into at least one Steam Generator before RCS Bleed and Feed is required.

BASIS: Failure to establish feedwater flow to any SG results in the crew's having to rely upon the lower priority action of establishing RCS bleed and feed to minimize core uncovery. This constitutes incorrect performance that "leads to degradation of any barrier to fission product release."
NOTE: This Critical Task will be considered NOT satisfied if in the opinion of the Evaluators the bleed and feed criteria is reached due to mis-operation, inaction or delay by the crew. If the bleed and feed criteria is reached as a direct result of the failure of the automatic MSLI then the action of the crew will be based on CT-2B. "Thus, when the crew fails to simply establish available feedwater flow (as it could, given postulated conditions) before SG dryout occurs, it necessitates the crew taking compensating action which complicates the event mitigation strategy.

CT#2B (FR-H.1 --B) Establish RCS Bleed and Feed before PZR PORVs open due to loss of heat sink.

BASIS: Failure to establish RCS bleed and feed before automatic opening of the PORVs reduces the probability of success to establish a heat sink for the core. This constitutes a "significant reduction of the safety margin beyond that irreparably introduced by the scenario"
NOTE: The PORV opening as stated in the critical task means opening caused by the RCS heatup from loss of heat sink. If the PORV opens for any other cause, it does not constitute a misoperation of the critical task.

VIII. ESG - PSA RELATIONSHIP EVALUATION

"I" ILT NRC-ESG-003
SALEM ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

Y/N	EVENT	Y/N	EVENT
N	TRANSIENTS with PCS Unavailable	N	Loss of Service Water
N	Steam Generator Tube Rupture	Y	Loss of CCW
N	Loss of Offsite Power	N	Loss of Control Air
N	Loss of Switchgear and Pen Area Ventilation	N	Station Black Out
N	LOCA		

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

Y/N	COMPONENT, SYSTEM, OR TRAIN	Y/N	COMPONENT, SYSTEM, OR TRAIN
N	Containment Sump Strainers	N	Gas Turbine
N	SSWS Valves to Turbine Generator Area	N	Any Diesel Generator
N	RHR Suction Line valves from Hot Leg	N	Auxiliary Feed Pump
N	CVCS Letdown line Control and Isolation Valves	N	SBO Air Compressor

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

Y/N	OPERATOR ACTION
N	Restore AC power during SBO
N	Connect to gas turbine
N	Trip Reactor and RCPs after loss of component cooling system
N	Re-align RHR system for re-circulation
N	Un-isolate the available CCW Heat Exchanger
N	Isolate the CVCS letdown path and transfer charging suction to RWST
N	Cooldown the RCS and depressurize the system
N	Isolate the affected Steam generator which has the tube ruptures
N	Early depressurize RCS
Y	Initiate feed and bleed

Complete this evaluation form for each ESG.

UNIT TWO PLANT STATUS TODAY

MODE:	1	POWER:	100	RCS BORON:	1192	MWe:	1200

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED):

N/A

REACTIVITY PARAMETERS

Core Burn-up 4000 MWD/MTU, reactivity plan provided by reactor engineering

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

3.7.1.2a. (21 AFW Pump) entered last shift, 66 hours remaining

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

21 AFW Pump C/Ted for Pump Inboard bearing Repair

ABNORMAL PLANT CONFIGURATIONS:

Currently K-3 in effect

CONTROL ROOM:

Unit 1 and Hope Creek at 100% power.
No penalty minutes in the last 24 hrs.

PRIMARY:

NONE

SECONDARY:

Heating steam is aligned to unit 1.

RADWASTE:

No discharges in progress

CIRCULATING WATER/SERVICE WATER:

River grass loading very high, high tide in 2 hours

X. SIMULATOR ESG REVIEW/VALIDATION CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

EXAMINATION SCENARIO GUIDE (ESG) REVIEW/ VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK **ESG-** "I" ILT NRC-ESG-003 **REVIEWER:** Ed Gallagher

____ 1. **THE SCENARIO HAS CLEARLY STATED OBJECTIVES IN THE SCENARIO.**

____ 2. The initial conditions are realistic, equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

____ 3. Each event description consists of:
- The point in the scenario when it is to be initiated,
- The malfunction(s) that are entered to initiate the event,
- The symptoms/cues that will be visible to the crew,
- The expected operator actions (by shift position), and
- The event termination point.

____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

____ 5. The events are valid with regard to physics and thermodynamics.

____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

____ 8. If time compression techniques are used, scenario summary clearly so indicates.

____ 9. The simulator modeling is not altered.

____ 10. All crew competencies can be evaluated.

____ 11. Appropriate reference materials are available (SOERs, LERs, etc.).

____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

____ 13. Proper critical task methodology is used IAW NRC procedures.

____ 14. ESG-PSA Evaluation Form is completed for the scenario at the applicable facility.

ATTACHMENT 1
SIMULATOR READY-FOR-TRAINING CHECKLIST

_____ 1. Verify simulator is in correct load for training

_____ 2. All required computer terminals in operation

_____ 3. Simulator clocks synchronized

_____ 4. Required chart recorders advanced and ON (proper paper installed)

_____ 5. Rod step counters correct (channel check)

_____ 6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____ 7. DL-10 log up-to-date

_____ 8. Required procedures clean

_____ 9. All OHA lamps operating (OHA Test)

_____ 10. All printers have adequate paper AND functional ribbon

_____ 11. Procedure pens available

_____ 12. Procedures in progress open and signed-off to proper step

_____ 13. Shift manning sheet available

_____ 14. SPDS reset

_____ 15. Reference verification performed with required documents available

_____ 16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____ 17. Required keys available

_____ 18. Video Tape (if applicable)

_____ 19. Ensure ECG Classification is correct - - 960502140 CRCA-03

_____ 20. Reset P-250 Rod Counters

ATTACHMENT 2
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgment of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

I. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

- degradation of any barrier to fission product release
- degraded emergency core cooling system (ECCS) or emergency power capacity
- a violation of a safety limit
- a violation of the facility license condition
- incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
- a significant reduction of safety margin beyond that irreparably introduced by the scenario

A. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

- effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
- recognize a failure or an incorrect automatic actuation of an ESF system or component.
- take one or more actions that would prevent a challenge to plant safety.
- prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) or ESF actuation.

ATTACHMENT 3

ESG PRE-JOB BRIEF CHECKLIST

EXAMINATION SCENARIO GUIDE (ESG) Pre-Job Brief Checklist

Note: This checklist is to be completed by the Lead Examiner prior to evaluating an ESG. The Lead Examiner should lead a pre-job brief with all the examiners and simulator operators that includes, but is not limited to the following:

ESG: "I" ILT NRC-ESG-003 Lead Examiner: _____

____ 1.ESG overview and sequence of major events.

____ 2.Determine which optional events will be performed, if any.

____ 3.ESG summary of Critical Tasks.

____ 4.Assign examiners to observe specific watch standers.

____ 5.Assign examiner ownership for observing and documenting performance / non-performance of Critical Tasks.

____ 6.Review alternate path(s) identified by the ESG.

____ 7.Assign examiner to document data related to the performance of Critical Tasks.

____ 8.Determines what parameters will be recorded in "Data Collection."

Ensure SOE recorder is recording.

SIMULATOR EXAMINATION SCENARIO

SCENARIO TITLE: LOPA

SCENARIO NUMBER: I ILT NRC ESG-004

EFFECTIVE DATE: 12/4/6

EXPECTED DURATION: 1.5 hours

REVISION NUMBER: 00

PROGRAM:

- [ ] **L.O. REQUAL**
- [X] **INITIAL LICENSE**
- [ ] **STA**
- [ ] **OTHER** _____

Revision Summary:

Rev 0: New Issue for I ILT NRC exam

PREPARED BY:	Paul Williams **(INSTRUCTOR)**	10/9/06 **(DATE)**
APPROVED BY:	_____ **(OPERATIONS TRAINNG MANAGER OR DESIGNEE)**	_____ **(DATE)**
APPROVED BY:	_____ **(OPERATIONS MANAGER OR DESIGNEE)**	_____ **(DATE)**

I. OBJECTIVES

A. Given the unit at power and a failure of a Power Range Nuclear Instruments, the crew will take corrective actions to stabilize the plant, IAW approved station procedures.

B. Given a situation with an OHA alarm, perform action(s) to investigate and correct the cause of the alarm, IAW approved station procedures.

C. Given the unit at power with a failed closed stop or governor valve, the crew will reduce load to <75% at 5%/min, AW approved station procedures.

D. Given RCPs with a malfunction, the crew will take action to remove the RCPs from service, IAW approved station procedures.

E. Given the unit with a loss of all vital busses, the crew will perform actions to attempt to recover vital busses and maintain RCP seal integrity, IAW approved station procedures.

II. MAJOR EVENTS

A. PR NIS Fails High

B. 23 SW Pump Strainer Clogs

C. Main Turbine Governor Valve Fails Closed

D. Inadvertent Phase B

E. LOPA

III. SCENARIO SUMMARY

A. The crew will receive the unit at 100% power with all systems in automatic. 2B D/G will be C/Ted. 2PR1 will be isolated due to a leak.

B. Once the crew assumes the watch, 2N44 will fail high. The RO will place rods in manual and the CRS will enter AB.NIS-0001 to remove the channel from service.

C. Before the channel is removed from service a high DP will occur on 23 SW strainer, header pressure will lower and the stand-by pump will fail to auto start. The crew will refer to the alarm response procedure stop the pump and start a stand-by pump.

D. Once the service water issue is addressed, a main turbine governor valve will fail closed. The crew will reduce power at 5%/min to 75% power. When boration is started for the power reduction the auto boron setpoint will fail to 5 gpm, the RO will initiate a manual boration

E. During the power reduction, an inadvertent Phase B will occur and the crew will trip the reactor and stop all RCPs IAW AB.RCP-0001.

F. During the reactor trip response all vital busses will be deenergized. The crew will transition to EOP-LOPA-1 and perform a rapid RCS cooldown. Once the cooldown is established the only source of AFW will trip and all feedflow capability will be lost. The crew will stop the cooldown on all but one SG.

G. Once the steaming strategy is established, the crew will be informed 2B D/G has been released and then they will start and load 2B Bus.

H. The scenario will terminate once the vital bus is energized or at the lead evaluators discretion.

IV. INITIAL CONDITIONS

____ Pre-snapped IC-194 from portable exam drive

MALFUNCTIONS:

SELF-CHECK		Description	Delay	Ramp	Trigger	Severity
____	1.	EL0273A 2A D/G breaker fails to close	NA	NA	NA	NA
____	2.	RP318Q1 2A D/G fails to start on SEC				
____	3.	SW0339E 25 SW Pump fails to auto start	NA	NA	NA	NA
____	4.	NI0193D 2N44 Fails High	NA	NA	RT-1	200
____	5.	SW0222C 23 SW Strainer Plugs	NA	1:30	RT-2	100
____	6.	TU0081H 24 Governor Valve Fails Closed	NA	NA	RT-3	NA
____	7.	CV0032 Boric Acid Flow Cntrlr Fails	NA	NA	RT-4	10
____	8.	VL0049 2CC117 Fails to Position	N/A	:10	RT-5	0
____	9.	VL0050 2CC118 Fails to Position	N/A	:10	RT-5	0
____	10.	VL0056 2CC190 Fails to Position	N/A	:10	RT-5	0
____	11.	VL0051 2CC187 Fails to Position	N/A	:08	RT-5	0
____	12.	VL0087 2CC131 Fails to Position	N/A	:09	RT-5	0
____	13.	VL0052 2CC136 Fails to Position	N/A	:10	RT-5	0
____	14.	AN0137 SER 137 :C16 Phase B	N/A	N/A	RT-5	2
____	15.	EL0134 Loss of Off-Site Power	1:00	NA	ET-6*	NA
____	16.	EL0146 2C Bus Fault	1:01	NA	ET-6*	NA
____	17.	VL0083 2SJ1 Fails to Position	NA	NA	RT-10	100
____	18.	VL0085 2CV40 Fails to Position	NA	NA	RT-10	0
____	19.	VL0053 2SW26 Fails to Position	NA	NA	RT-10	0
____	20.	VL0045 2CV116 Fails to Position	NA	NA	RT-10	0
____	21.	AF0183, 23 Aux FW Pmp Overspeed Trip	N/A	N/A	RT-7	False

REMOTES:

SELF-CHECK		Description	Delay	Ramp	Trigger	Condition
____	1.	DG21D 2B DIG BKR RACK OUT	N/A	N/A	N/A	Tagged
____	2.	DG19D 2B DIESEL GEN LOCKED OUT	N/A	N/A	N/A	Yes
____	3.	DG20D 2B DG BKR CONTROL POWER	N/A	N/A	N/A	Off
____	4.	DG01D DEENERGIZE "A" SEC CABINET	N/A	N/A	RT-11	Off
____	5.	DG02D DEENERGIZE "B" SEC CABINET	:20	N/A	RT-11	Off
____	6.	DG03D DEENERGIZE "C" SEC CABINET	:45	N/A	RT-11	Off
____	7.	AF20D 21 AFW Pump Control Power	NA	NA	RT-12	Off
____	8.	AF25D 22 AFW Pump Control Power	30 secs	NA	RT-12	Off
____	9.	CV28A-31A 22-24CV98s	NA	NA	RT-13	0.0

OVERRIDES:

SELF-CHECK		Description	Delay	Ramp	Trigger	Action
____	1.	A503 OVLO TRAIN 'A' - SPRY ACT/ PH-B ISL	N/A	N/A	RT-5	On
____	2.	A503 OVLO TRAIN 'A' - SPRY ACT/ PH-B ISL	N/A	N/A	RT-5	On
____	3.	A503 OVLO Train A Cont Iso Ph B Reset	N/A	N/A	RT-5	Off
____	4.	4813 OVLO PHASE B ISOL - 2CC117	N/A	N/A	RT-5	Off
____	5.	4813 OVLO PHASE B ISOL - 2CC117	:08	N/A	RT-5	On
____	6.	4816 OVLO PHASE B ISOL - 2CC118	:09	N/A	RT-5	On
____	7.	4818 OVLO PHASE B ISOL - 2CC190	:10	N/A	RT-5	On
____	8.	4815 OVLO PHASE B ISOL - 2CC187	:06	N/A	RT-5	On
____	9.	4814 OVLO PHASE B ISOL - 2CC131	:08	N/A	RT-5	On
____	10.	4817 OVLO PHASE B ISOL - 2CC136	:09	N/A	RT-5	On
____	11.	4451 OVLO PERMISSIVE CONTAINMENT PHASE B	N/A	N/A	RT-5	On
____	12.	CB05 OVDI 2A DIESEL GEN-BREAKER CLOSE	N/A	N/A	N/A	Off

EVENT TRIGGERS:			
SELF-CHECK	ET#n	Description	Command
____ 1.	6	MONP254<10	

TAGGED EQUIPMENT:	
	Description
____	1. RH1 and RH2
____	2. VC 1-4
____	3. RH 18's
____	4. RCPs (SELF CHECK)
____	5. RT (SELF CHECK)
____	6. MS 167s (SELF CHECK)
____	7. 500 KV SWYD (SELF CHECK).
____	8. 22 ABV Supply Fan
____	9. 23 CV Pump (SELF CHECK)
____	**10. 2B D/G (C/T)**

OTHER CONDITIONS:	
	Description
____	1. Close 2PR6

V. SEQUENCE OF EVENTS

A. State shift job assignments:

B. Hold a shift briefing, detailing instruction to the shift: (provide CREW members a copy of the shift turnover sheet)

C. Inform the crew "The simulator is running. You may commence panel walkdowns at this time. CRS please inform me when your crew is ready to assume the shift".

D. Allow sufficient time for panel walk-downs. When informed by the CRS that the crew is ready to assume the shift, ensure the simulator is cleared of unauthorized personnel.

E. Do not review objectives with crew

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

1. N-44 Fails High

Insert RT-1

- RO responds to the following:
  - E-15 – PR Flux Hi;
  - E-31 – PR OVRPWR Rod Stop;
  - E-39 – PR Ch Dev; and
  - E-47 – PR Neutron Flux Rate Hi
- RO verifies no runback in progress and places Rods in Manual with concurrence from the CRS

EVALUATOR NOTE: Crew may enter procedure S2.OP-AB.ROD-0003 first, but will transition to S2.OP-AB.NIS-0001

- CRS enters S2.OP-AB.NIS-0001.
- PO verifies no load change.
- Crew identifies that N-44 failed high.
- CRS notifies I&C of failed channel and requests assistance.
- RO/PO reviews OHAs in alarm and refers to ARP.

EVALUATOR NOTE: Do not wait for channel to be taken out of service prior to moving to next event.

- CRS initiates S2.OP-SO.RPS-0001.
- CRS briefs crew on inability to withdraw control rods and determines contingent actions based on this inability

EVALUATOR NOTE: Proceed to next event after the Tech Specs has been determined or as directed by the Lead Evaluator.

- SRO reviews Tech Specs and enters 3.3.1.1, Action 2

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

2. 23 Service Water Strainer dp High

Insert RT-2 on cue form lead evaluator	• Crew acknowledges OHA B-8, 21-23 SW Strain Trbl followed by B13 and 14 for SW header Pressure LO • PO verifies SW header pressure lowering and notes that 25 SW pump did not Auto Start
CRS may direct 25 SW pump started in manual or may direct another pump started	• CRS directs standby SW pump started
	• PO informs CRS of lowering amps on 23 SW pump
Role Play: 4 minutes after dispatched call as NEO and inform Control Room that 23 SW strainer is not turning, motor is on and gear box is making a grinding sound	• Crew dispatches NEO to investigate strainer trouble • Crew directs NEO to collect data IAW Observation Data Sheet
When requested REMOTES SW:32D to off for 23 SW Pump Control Power	• CRS directs 23 SW pump stopped
Crew should discuss configuration control for 23 SW pump and control power breaker	• CRS directs control power removed from 23 SW pump
Proceed to next event after TSAS determination or at lead evaluators discretion	• CRS/STA refer to TS and enter tracker for 3.7.4

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments

3. Main Turbine Governor Valve 24MS29 (GV-4) Fails Closed

Insert RT-3 on cue from Lead Evaluator.

- Crew identifies loss of turbine load by:
  - Lowering Mwe,
  - Rising Tavg/ PZR pressure,
  - OHA E-28, PZR HTR ON PRESS LO
  - Tave-Tref console alarm.

Insert RT-4 after boration is started

- RO controls Tavg with rods in manual
- PO identifies 24MS29 Closed using DEHC HMI indications.

ROLE PLAY: After several minutes, NEO reports EHC fluid leak on fittings of 24MS29.

- CRS dispatches NEO to investigate cause of valve closure.
- CRS reviews S2.OP-SO.TRB-0001 precautions and limitations and determines load limitation of < 75% with failed governor valve.
- CRS orders a turbine load reduction at 5%/minute IAW S2.OP-SO.TRB-001.
- RO/PO coordinate actions to reduce turbine load to < 75% power.
- CRS directs entry into S2.OP-AB.LOAD-1.
- CRS initiates Attachment 1 (CAS).
- RO initiates boration for Tavg and ΔI control
- RO informs CRS boric acid flow controller has failed
- CRS directs RO to perform manual

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	boration • RO starts manual boration IAW SO.CVC-0006 • RO energizes PZR heaters.	
4/5. Inadvertent Phase B Actuation and Loss of All AC Power		
Enter RT-5 at discretion of Lead Evaluator. Insure ET-6 enters when Reactor is tripped.	• RO identifies Phase B Actuation • RO identifies loss of CCW to RCPs • CRS implements ARP for OHAs	
CT#1: Manually trip the reactor and stop RCPs from the control room within 5 minutes of OHA C-16 **TIME:____:____:____ of C-16** **TIME:____:____:____ of RCP stop** **SAT_____ UNSAT_____**	• CRS implements AB.RCP-0001 • RO reports Phase B is invalid based on Containment pressure • CRS directs RO to reset Phase B	
NOTE: OHA C-16 directs attempted reset of Phase B to restore CCW; loss of CCW is also entry condition for AB-RCP. Crew may not attempt to reset Phase B and may go directly to Reactor Trip	• RO attempts to reset Phase B and reports it cannot be reset • CRS directs RO to manually trip the reactor and stop all RCPs • RO trips the reactor and stops all RCPs • RO completes IA's of TRIP –1 o Verifies Rx Trip o Trips turbine o Verifies NO Vital Bus energized o CRS directs entry into TRIP-1	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• CRS transitions to EOP-LOPA-1	
	• CRS verifies IA's of LOPA-1 complete	
	• RO verifies both PZR PORVs closed	
	• RO Isolates Letdown	
	• PO verifies AFW >22E04 lbm/hr	
	• RO makes page announcement	
	• CRS directs operators to perform Attachment 2, Part A of AB.LOOP-1	
ROLE PLAY: Three minutes later insert RT-11 then report all SECs deenergized	• CRS dispatches NEO to deenergize all SEC's	
	• CRS briefs crew and SM contacts Maintenance Groups	
	• CREW performs manual Vital Bus stripping IAW LOPA-1, Table A	
	• CRS directs PO to attempt to start 2A EDG	
	• PO reports 2A EDG has started	
	• PO reports 2A EDG output breaker will not close	
After 5 mins report as Maintenance that the 2A EDG HL limit switch is not made up and the breaker is jammed in the cubical	• SM/CRS request assistance from maintenance with 2A EDG breaker	
	• PO secures 2A and 2B EDGs since they has no SW	
ROLE PLAY: Ten minutes after contacted report valves positions Enter RT-10	• CRS dispatches NEO to OPEN 2SJ1 or 2 and CLOSE 2CV40 and 41	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	• CRS dispatches NEO to isolate SW to Turbine Area by closing 2SW26 • CRS directs initiation of Safety Injection • CRS directs closure of Phase A valves and CVI valves • RO/PO close valves as directed	
NOTE: CRS may delay stopping 2A EDG for several minutes until report on breaker condition is given.		
CT#2: Stop any EDG running w/o SW prior to engine overheating. **SAT_____ UNSAT_____**	• RO resets Safeguards and opens 21/22CA330	
ROLE PLAY: Five minutes after contacted report control power to 21 and 22 AFW Pp removed and breakers open (if req) (RT-12)	• CRS directs NEO to remove 125VDC Control Power from 21 and 22 AFW Pps	
ROLE PLAY: NEO reports 2C bus locked out on Diff		
	• CRS directs CREW to take actions to restore power IAW AB.LOOP-1 concurrent with continuing with LOPA-1	
ROLE PLAY: 10 minutes after contacted but not before restoration and loading of 2B EDG report 2CV83, 2CV89, 2CV95, 2CV116 and 2CC131 closed	• CRS directs RCP Seal Cooling isolation	
CT#3: (ECA-0.0-H) Isolate RCP seal injection before a Charging Pp starts or is started **Sat_____ Unsat_____**	• PO initiates MSLI, MFW isolation, and SG Blowdown isolation/sampling • PO evaluates for a faulted SG • PO evaluates for a ruptured SG • PO maintains maximum AFW flow	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
	until at least one SG is >9% • CRS assigns a NCO Checkoff sheet 3	
NOTE: Once SG depressurization is established, trip 23 AFW Pp Enter RT-7	• PO commences SG depressurization once one SG is >9% to 235 psig • CRS reviews Cautions, Notes and Termination Criteria for SG depressurization	
CT#4: (ECA-0.0-G) Depressurize intact SGs at max rate as long as one intact SG can be maintained >9% **Sat_____ Unsat_____**	• PO identifies loss of 23 AFW Pp • CRS briefs crew on strategy for continuing SG depressurization and maintaining at least 1 SG greater than 9%	
NOTE: Depending on timing of scenario and rate of AFW addition maintaining 1 SG >9% may not be possible	• PO adjusts steaming rates to maintain 1 SG>9% • PO terminates SG depressurization if all SG NR levels go <9% • CRS directs an NEO/Maintenance to investigate the loss of 23 AFW Pp	
When the Crew has demonstrated a steaming strategy to the satisfaction of the lead evaluator; Restore 2B EDG remotes and report as Maint that 2B EDG has been released and is ready for service **NOTE: If breaker for 22 AFW pump was not opened then the pump will start when bus is energized. If**	• CRS directs PO to start 2B EDG and close the output breaker • CRS direct the RO to start 23 or 24 SW pump and verify/close 2SW26 • CRS directs control power restored to 22AFW pump and directs pump started	

Evaluator/Instructor Activity	Expected Plant/Student Response	Comments
breaker was tripped then will need to cycle control power to get pump to start.		
	• PO recommences depressurization of all SGs when SG levels in one intact SG is >9%	
NOTE: Scenario can be terminated when SG depressurization/AFW flow is restored, or at the discretion of the Lead Evaluator		

VI. SCENARIO REFERENCES

A. Alarm Response Procedures (Various)
B. Technical Specifications
C. SC.OP-AP.ZZ-0102(Q), Use of Procedures
D. S2.OP-AB.NIS-0001 – NIS Malfunction
E. S2.OP-AB.ROD- 0003 – Continuous Rod Motion
F. S2.OP-SO.RPS-0001, Nuclear Instrumentation Channel Trip/Restoration
G. S2.OP-AB.SW-0001 – Loss of SW Header Pressure
H. S2.OP-SO.SW-0001 – Service Water System operation
I. S2.OP-AB.RCP-0001, Reactor Coolant Pump Abnormality
J. S2.OP-AB.LOOP-0001, Loss of Off Site Power
K. 2-EOP-TRIP-1, Reactor Trip or Safety Injection
L. 2-EOP-LOPA-1 – Loss of All AC Power

VII. ESG CRITICAL TASK RATIONAL

CT# 1: Manually trip the reactor from the control room within 5 minutes of OHA C-16

BASIS: Conditions requiring immediate attention for operation of the RCPs. These recommendations are incorporated from Westinghouse Tech Bulletin ESBU-TB-93-01-R1

CT# 2: **(LOPA-1 CAS)** Stop any EDG running w/o SW

BASIS: Running the EDG without ESW cooling leads to a high temperature condition that can result in EDG failure due to damage caused by engine overheating. (WOG ERG Based Critical tasks)
IF a Diesel is started and can not be promptly supplied with SW cooling, it is tripped to prevent damage until SW cooling is available (LOPA-1 Basis Document)

CT# 3: **(ECA-0.0-H)** Isolate RCP seal injection before a Charging Pp starts or is started

BASIS: Failure to isolate RCP seal injection before starting a charging pump, under the postulated plant conditions, can result in unnecessary and avoidable degradation of the RCS fission-product barrier. (WOG ERG Based Critical tasks)

CT# 4: **(ECA-0.0-G)** Depressurize intact SGs at max rate such that <u>all</u> of the following limiting conditions are met:

- SG depressurization is <u>not</u> initiated until narrow range level in at least one intact SG is >9%
- If narrow range level cannot be maintained >9% in at least one intact SG, then depressurization is stopped until narrow range is restored to >9% in at least one intact SG
- SG pressure does not lower to <135 psig
- RCS cold leg temperature does not lower to <310°F
- If positive SUR is indicated on either the source range or intermediate range, then the depressurization is stopped and the RCS is allowed to heat up

BASIS: Failure to depressurize the secondary and cool down the RCS, under the postulated plant conditions, results in a greater possibility for core damage. The intact SGs should be depressurized as quickly as possible to minimize RCS inventory loss, but within the constraint of controllability.... The PORVs on all intact SGs should be wide open, provided that none of the limiting conditions associated with this critical task are violated. (WOG ERG Based Critical tasks)

VIII. ESG - PSA RELATIONSHIP EVALUATION

"I" ILT NRC-ESG-004
SALEM ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

Y/N	EVENT
N	TRANSIENTS with PCS Unavailable
N	Steam Generator Tube Rupture
Y	Loss of Offsite Power
N	Loss of Switchgear and Pen Area Ventilation
N	LOCA
N	Loss of Service Water
Y	Loss of CCW
N	Loss of Control Air
Y	Station Black Out

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

Y/N	COMPONENT, SYSTEM, OR TRAIN
N	Containment Sump Strainers
N	SSWS Valves to Turbine Generator Area
N	RHR Suction Line valves from Hot Leg
N	CVCS Letdown line Control and Isolation Valves
N	Gas Turbine
Y	Any Diesel Generator
N	Auxiliary Feed Pump
N	SBO Air Compressor

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

Y/N	OPERATOR ACTION
Y	Restore AC power during SBO
N	Connect to gas turbine
Y	Trip Reactor and RCPs after loss of component cooling system
N	Re-align RHR system for re-circulation
N	Un-isolate the available CCW Heat Exchanger
N	Isolate the CVCS letdown path and transfer charging suction to RWST
Y	Cooldown the RCS and depressurize the system
N	Isolate the affected Steam generator which has the tube ruptures
N	Early depressurize RCS
N	Initiate feed and bleed

Complete this evaluation form for each ESG.

UNIT TWO PLANT STATUS TODAY

MODE: 1 POWER: 100 RCS BORON: 840 MWe:1190

SHUTDOWN SAFETY SYSTEM STATUS (5, 6 & DEFUELED):

N/A

REACTIVITY PARAMETERS

Core Burn-up 10,500 MWD/MTU

MOST LIMITING LCO AND DATE/TIME OF EXPIRATION:

3.8.1.1b – 2B D/G C/Ted for generator brush inspection

EVOLUTIONS/PROCEDURES/SURVEILLANCES IN PROGRESS:

ABNORMAL PLANT CONFIGURATIONS:

Currently K-3 in effect

CONTROL ROOM:

Unit 1 and Hope Creek at 100% power.
No penalty minutes in the last 24 hrs.
Winter Storm Alert for next 24 hours

PRIMARY:

NONE

SECONDARY:

Heating steam is aligned to unit 1.

RADWASTE:

No discharges in progress

CIRCULATING WATER/SERVICE WATER:

X. SIMULATOR ESG REVIEW/VALIDATION CHECKLIST

Note: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

EXAMINATION SCENARIO GUIDE (ESG) REVIEW/ VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK **ESG-** "I" ILT NRC-ESG-004 **REVIEWER:** Paul Williams

____ 1. **THE SCENARIO HAS CLEARLY STATED OBJECTIVES IN THE SCENARIO.**

____ 2. The initial conditions are realistic, equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

____ 3. Each event description consists of:
- The point in the scenario when it is to be initiated,
- The malfunction(s) that are entered to initiate the event,
- The symptoms/cues that will be visible to the crew,
- The expected operator actions (by shift position), and
- The event termination point.

____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

____ 5. The events are valid with regard to physics and thermodynamics.

____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

____ 8. If time compression techniques are used, scenario summary clearly so indicates.

____ 9. The simulator modeling is not altered.

____ 10. All crew competencies can be evaluated.

____ 11. Appropriate reference materials are available (SOERs, LERs, etc.).

____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

____ 13. Proper critical task methodology is used IAW NRC procedures.

____ 14. ESG-PSA Evaluation Form is completed for the scenario at the applicable facility.

ATTACHMENT 1
SIMULATOR READY-FOR-TRAINING CHECKLIST

_____ 1. Verify simulator is in correct load for training

_____ 2. All required computer terminals in operation

_____ 3. Simulator clocks synchronized

_____ 4. Required chart recorders advanced and ON (proper paper installed)

_____ 5. Rod step counters correct (channel check)

_____ 6. All tagged equipment properly secured and documented (TSAS Log filled out)

_____ 7. DL-10 log up-to-date

_____ 8. Required procedures clean

_____ 9. All OHA lamps operating (OHA Test)

_____ 10. All printers have adequate paper AND functional ribbon

_____ 11. Procedure pens available

_____ 12. Procedures in progress open and signed-off to proper step

_____ 13. Shift manning sheet available

_____ 14. SPDS reset

_____ 15. Reference verification performed with required documents available

_____ 16. Ensure a current RCS Leak Rate Worksheet is placed by Aux Alarm Typewriter with Baseline Data filled out

_____ 17. Required keys available

_____ 18. Video Tape (if applicable)

_____ 19. Ensure ECG Classification is correct - - 960502140 CRCA-03

_____ 20. Reset P-250 Rod Counters

ATTACHMENT 2
CRITICAL TASK METHODOLOGY

In reviewing each proposed CT, the examination team assesses the task to ensure, that it is essential to safety. A task is essential to safety if, in the judgment of the examination team, the improper performance or omission of this task by a licensee will result in direct adverse consequences or in significant degradation in the mitigative capability of the plant.

The examination team determines if an automatically actuated plant system would have been required to mitigate the consequences of an individual's incorrect performance. If incorrect performance of a task by an individual necessitates the crew taking compensatory action that would complicate the event mitigation strategy, the task is safety significant.

I. Examples of CTs involving essential safety actions include those for which operation or correct performance prevents...

- degradation of any barrier to fission product release
- degraded emergency core cooling system (ECCS) or emergency power capacity
- a violation of a safety limit
- a violation of the facility license condition
- incorrect reactivity control (such as failure to initiate Emergency Boration or Standby Liquid Control, or manually insert control rods)
- a significant reduction of safety margin beyond that irreparably introduced by the scenario

A. Examples of CTs involving essential safety actions include those for which a crew demonstrates the ability to...

- effectively direct or manipulate engineered safety feature (ESF) controls that would prevent any condition described in the previous paragraph.
- recognize a failure or an incorrect automatic actuation of an ESF system or component.
- take one or more actions that would prevent a challenge to plant safety.
- prevent inappropriate actions that create a challenge to plant safety (such as an unintentional Reactor Protection System (RPS) or ESF actuation.

ATTACHMENT 3

ESG PRE-JOB BRIEF CHECKLIST

EXAMINATION SCENARIO GUIDE (ESG) Pre-Job Brief Checklist

Note: This checklist is to be completed by the Lead Examiner prior to evaluating an ESG. The Lead Examiner should lead a pre-job brief with all the examiners and simulator operators that includes, but is not limited to the following:

ESG: "I" ILT NRC-ESG-004 Lead Examiner: _____

____ 1.ESG overview and sequence of major events.

____ 2.Determine which optional events will be performed, if any.

____ 3.ESG summary of Critical Tasks.

____ 4.Assign examiners to observe specific watch standers.

____ 5.Assign examiner ownership for observing and documenting performance / non-performance of Critical Tasks.

____ 6.Review alternate path(s) identified by the ESG.

____ 7.Assign examiner to document data related to the performance of Critical Tasks.

____ 8.Determines what parameters will be recorded in "Data Collection."

Ensure SOE recorder is recording.