NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

SIMULATOR LESSON PLAN

02-REQ-009-TRA-2-42 Revision 0

TITLE: SIMULATOR TRAINING FOR EOP RL AND C1

	SIGNATURE	DATE
PREPARED BY		7/12/91
VALIDATED BY		7/12/91
SUPERVISOR OPS TRAINING		7/12/91
PLANT SUPERVISOR/ USER GROUP SUPERVISOR	FOR J BITTENBENDER	7/12/91

Summary of Pages

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TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

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4/29/101

A. TRAINING DESCRIPTION

1. Title of Lesson Plan: Simulator Training for EOP RL and C1
2. Estimated Duration of Lesson: 1.5 hrs
3. Prerequisites:
   a. Instructor:
      Qualified in accordance with NTP-16.
   b. Trainees:
      Meet eligibility requirements per 10CFR55.
4. References:
   a. EOP Bases Document
   b. EOP-RPV section RL
   c. EOP-C1
   d. EOP-6 Attachments
5. Manipulations Performed:
   a. O2-REQ-MAN-A14-2-0, Loss of All Feedwater

B. REQUIREMENTS

1. NTP-11, Licensed Operator Requalification Training

C. PRE-EXERCISE BRIEF

Conduct in accordance with NTI-4.3.1 using Attachment 1 as a guide.

D. SIMULATOR SET-UP

1. Initialize to IC-20
2. Change the simulator conditions as follows:
   a. Markup HPCS pump out of service
3. Presets
   a. Preset Malfunctions
      1) 1,RC04 RCIC Turbine Speed Cont. Fails Low
      2) 2,RH14B Div II ECCS Fails to Initiate
      3) 3,DG01A Div I Diesel Fails to Start
      4) 4,RH02C 2RHS*MOV24C Fails to Open
   b. Preset I/O
      None
   c. Preset Remotes
      None

E. POSITION ASSIGNMENTS

Ensure proper rotation of trainees is performed to meet the requirements of the training session.

F. SCENARIO SUMMARY

Scenario begins with the crew operating at 100% power. Shortly after the crew assumes the shift the Feed and Condensate System will be lost due to electrical faults on all operating condensate pumps. The crew will take action to manually scram the reactor and attempt to restore level with RCIC. A malfunction in the RCIC will cause the crew to enter EOP-C1 alternate level control. Attempts to line up subsystems will be complicated by an electrical fault on the Division I emergency switchgear. The crew will lineup alternate subsystems when the B RHR pump trips on electrical fault. The casualty is further complicated by a failure of 2RHS*MOV24C to open. The scenario is terminated if injection is establish with service water via RHR B and 2RHS*MOV24C has been opened resulting in water level rising.

G. LEARNING OBJECTIVES

LO-1.0 Demonstrate effective communications in accordance with the Operations Department Instruction on verbal communications.

LO-2.0 Demonstrate for those exercises that require use of the Emergency Plan, an understanding of the roles and responsibilities of the SSS, ASSS/STA and the CSO/NAOE in accordance with Operation Department Instructions.

LO-3.0 SRO's shall demonstrate an understanding of command and control, EOP place keeping techniques and effective use of Control Room personnel during emergency conditions.

LO-4.0 Operators shall demonstrate "Self Verification" work practices in accordance with Operations Department Instructions.

LO-5.0 Given a reactor plant operating at full power and a loss of high pressure feedwater the operating crew will take action to manually scram the reactor prior to RPV level reaching 159.3 inches.

Tasks:

RO: Perform the actions required for a loss of all feedwater and HPCS. (2009100501)

SRO: Direct the actions for a loss of all feedwater. (3449220503)

LO-6.0 Given a shutdown reactor with no high pressure injection systems the operating crew will take action to lineup 2 injection subsystems.

Tasks:

RO: Perform the actions required for a reactor level low. (2000310501)

SRO: Direct the actions required per EOP-RPV section RL. (3449400603)

LO-7.0 Given a shutdown reactor with only one injection subsystem the operating crew will lineup alternate subsystems for injection.

Tasks:

RO: Inject into the vessel using non-preferred injection systems as directed by the EOP's. (2009280501)

SRO: Direct the actions required per EOP-C1, Alternate Level Control. (3449510603)

LO-8.0 Given a shutdown/depressurized reactor the operating crew will inject with available systems until RPV level is rising.

Tasks:

RO: Inject into the vessel using non-preferred injection systems as directed by EOP's. (2009280501)

SRO: Direct the actions required per EOP-C1, Alternate Level Control. (3449510603)

LO-9.0 Given EOP-RPV section RL the operating crew will be able to discuss the basis for each step in accordance with the N2-EOP Bases Document.

Tasks:

RO: Perform the actions required for a reactor water level low. (2000310501)

SRO: Direct the actions required per EOP-RPV section RL. (3449400603)

LO-10.0 Given EOP-C1 the operating crew will be able to discuss the buses for each step in accordance with the N2-EOP Bases Document.

Tasks:

RO: Inject into the vessel using non-preferred injection systems as directed by the EOP's. (2009280501)

SRO: Direct the actions required per EOP-C1, Alternate Level Control. (3449510603)

H. LESSONS LEARNED

I. TURNOVER INFORMATION

1. Give the following information for initial conditions:

Core Life: BOL

Description: Plant operating above the 100% rod line.

Rod Sequence Information: Step 92

2. Tech. Spec. limitations in effect:
   a. 2 Day of 14 day LCO due to HPCS inop.

3. Significant problems/abnormalities:
   a. HPCS marked up for shaft alignment check

4. Evaluations/maintenance for the on-coming shift:
   a. Continue HPCS maintenance.

J. SCENARIO

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
1. Provide Turnover Information to SSS.	SSS provides crew turnover		
2. When SSS completes turnover commence the scenario.	Crew assumes the shift		
3. Enter malfunction 5,FW01A - "A" Condensate pump trips on electrical fault.	CSO/E a. Reports pump trip b. Monitors feed and condensate system for proper operation. SSS/ASSS a. Direct investigation of pump trip.		
4. Two minutes after the "A" Condensate pump trips enter malfunction 6,FW01 - Trips the remaining condensate pumps Role Play: When directed to investigate the pump trips, report that they tripped on overcurrent.	Crew a. Identify that the Feedwater System lost. SSS/ASSS a. Direct the mode switch to shutdown.		LO-1.0

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	CSO/E a. Place the mode switch in shutdown. b. Report power below 4% and all rods in. c. Perform scram actions per OP-101C .		
	SSS/ASSS a. Enters EOP-RPV control on low water level. b. Directs RPV level restored using RCIC		
Note: Observe for Self Verification Work Practices	CSO/E a. Starts RCIC using the manual initiation pushbutton. b. Reports RCIC started but will not inject.		
	SSS/ASSS a. Directs the Standby CRD pump started		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
5. When crew commences the cooldown enter malfunction 7,ED05A - Div I Emergency Switchgear trips on fault.	b. Directs cooldown commenced not to exceed 100°F/hr. CSO/E a. Starts the Standby CRD pump b. Commences to lower pressure using turbine bypass valves not to exceed 100°/hr.		
Div I Emergency Switchgear trips.	Crew a. Reports loss of Div I and failure of DG to start. SSS a. Directs actions for loss of Div I switchgear. b. Exits RL and enters C1.		
When SSS exits RL go to freeze.			
Using the EOP Bases Document and the Simulator conditions have the crew answer the following.			LO-9.0

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Q: What is the effect on indicated water level if the reference leg starts to boil?	A: Decreases the density, which will lower the D/P sensed by the instrument causing RPV level to indicate higher.		
Q: What is the bases for the Minimum Indicated Level?	A: Highest RPV water level indication which results from off-calibration instrument temperature conditions when level is actually at the elevation of the instrument variable leg tap.		
Q: Why are you directed to initiate Isolations, ECCS and Diesel Generators?	A: To assure initiation of those automatic actions important for controlling RPV water inventory. 1. Isolations - Try to terminate the loss of coolant. 2. ECCS - Aligns sources of makeup water for injection.		

3. Diesels - Assures backup power available if needed.

Q: Why do we exit RL if the reactor is not shutdown?

A: Steps in RL may not be appropriate if the reactor is critical.

Note: Review the difference in allowable injection sources.

Q: Why do we go to RPV flooding if we do not know level?

A: Assure adequate core cooling.

Q: What would be the effect of exceeding the Maximum Primary Containment Water Level Limit.

A: Containment failure

Q: Define the Maximum Primary Containment Water Level Limit.

A: The elevation of the highest containment vent capable of rejecting all core decay heat.

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Q: Why is water level given a band of 159.3 to 202.3?	A: Upper level prevents L8 trips and the lower level assures adequate core cooling and allow resetting the scram. The wide range was elected to avoid unwarranted demands on operator attention so he can perform other duties concurrently.		
Review the injection sources listed and their associated notes.			
Q: If water level cannot be maintained above 159.3 why is are band lowered to -14 inches?	A: The widened control band provides additional time to place injection systems not yet operating in service while still assuring adequate core cooling.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Review the injection sources listed for this step. Also discuss that these systems provide relatively low quality water. The intent of this step is for the operator to use a source of water that will minimize corrosion and cleanup time before resuming normal operation.			
Q: What are the possible consequence of allowing ADS to initiate.	A: An ADS actuation will: 1. Impose a severe pressure and temperature transient on the RPV. 2. Compliance the effort to restore and maintain RPV water level.		

3. In severe cases with no low pressure injection systems available, may create a loss of adequate core cooling and subsequent core damage which otherwise could have been avoided.

Q: Why are we allowed to inhibit ADS?

A: The conditions assumed in the design of the ADS logic (no operator action for 10 minutes) do not exist when the operator is executing the steps of this procedure. Having access to more information than the ADS logic, the operator is in a better position to judge when and how to depressurize the RPV while minimizing transient loads and optimizing adequate core cooling.

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	Placing the ADS logic inhibit switches in "ON" is the approved NMP2 method for preventing automatic initiation. If depressurization of the RPV is subsequently required, explicit direction is provided in the appropriate EOP. Thus, any requirement to maintain the automatic initiation capability of ADS is not required.		
Direct the SSS to provide an update and continue with the scenario.			
6. Resume the Scenario	SSS/ASSS a. Direct ADS logic inhibit to ON. b. Directs LPCI B and C lined up for injection.		LO-6.0

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	CSO/E a. Place ADS logic inhibit to ON. b. Start LPCI B and C pumps		
	CSO/E a. Report that injection with LPCI B and C will not work until pressure is lowered.		
7. When SSS enters the wait statement for -14 inches: Enter malfunction 7,RH01B B RHR pump trips on electrical fault.	SSS/ASSS a. Enters wait statement for -14 inches b. Anticipate emergency depressurization and open the turbine bypass valves. (SSS may decide to perform this prior to -14 inches)		
	CSO/E a. Control pressure as directed.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	SSS/ASSS		
	a. Directs service water lined up to RHR B for RPV injection.		LO-7.0
	CSO/E		
	a. Line up Service Water per EOP 6 Att 5.		LO-8.0
	b. Reports to SSS when Service Water lined up for injection.		
	c. Report failure of MOV24C when D/P permissive satisfied.		
	d. Commence injection with Service Water via RHR B when vessel depressurization complete.		
	e. Direct operators to locally open MOV24C.		

8. Clear malfunction 4 when Service Water injection is commenced if it was requested to locally operate 2RHS*MOV24C. Report that you freed the valve.

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	SSS/ASSS a. Exit RP and enter C2 if water level reaches -14 inches. b. Direct injection with RHR C. CSO/E a. Opens 7ADS valves b. Opens MOV24C c. Reports water level rising		
9. Freeze the scenario	SSS/ASSS a. Exits C1 and enters RL		
10. Using the established Simulator conditions and the EOP Bases Document review the following.			LO-10.0
11 Using the EOP Bases Document review the first series of overrides in EOP C-1.			
Q: What is the definition of a subsystem?	A: A motor driven system loop which is independently capable of supplying makeup water to the RPV.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Q: Why do we line up 2 subsystems.	A: The purpose of lining up and starting pumps in two or more RPV injection subsystems is to provide the appropriate assurance that water will be injected into the RPV during and following RPV depressurization. A requirement for at least two subsystems is specified in this step to accommodate the possibility that one subsystem may not operate properly or that a break may exist in the flowpath of one subsystem.		
Q: Why are we allowed to exceed Vortex and NPSH limits?	A: The undesirable consequences of uncovering the reactor core out weigh the risk of equipment damage which could result if NPSH or Vortex limits are exceeded.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	In addition, immediate and catastrophic pump failure is not expected should operation beyond these limits be required; at most degraded system or pump performance may result from prolonged operation under these conditions.		
Q: Why do we desire at least 2 subsystems lined up?	A: To assure there is sufficient makeup to the RPV if pressure is below, or is depressurized below, the shutoff head of the pumps in service.		
Review each of the alternate subsystems and where they inject.			
Q: Will any of the alternate subsystems inject with RPV pressure above 195 psig?	A: Yes - SLC		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Q: What is the purpose of this decision block?	A: Determines which systems are available for makeup to the RPV.		
Q: Why do we only want to use alternate subsystems as a last resort?	A: Use of the alternate subsystems will only be directed as a last resort and only when all RPV injection systems and subsystems are unavailable. Use of alternate subsystems result in the injection of poor quality water into the RPV and should be avoided, when at all possible, to expedite plant restoration following the emergency.		

Q: Why do we transition to point G in pressure drops below 195 psig?

A: RPV pressure may decrease below that corresponding to the highest shutoff head (195 psig) of a low water quality alternate subsystem. If this condition occurs, appropriate actions to control RPV water level below this pressure begin at G, and operator actions are transferred accordingly.

Q: Why are we looking for at least one subsystem to be lined up.

A: To decide if the use of alternate subsystem is warranted.

Q: Why do we hold until -14 inches?

A: Because adequate core cooling exists as long as water level is above -14 inches.

12. Using the EOP Bases document as needed, review the remaining EOP-C1 steps.

13. Review the learning objectives.

K. POST EXERCISE ASSESSMENT

1. The instructor may review the Scenario Summary, Learning Objectives and the Lessons Learned with the crew.

   The Lessons Learned should be reviewed even if no errors were committed.

2. The crew may perform a self assessment.

   Have the crew assess their performance in relation to the Lessons Learned and the Learning Objectives for this exercise.

   The individual who was the SSS during the scenario should lead the assessment.

3. Instructors Assessment

   The instructors may provide an assessment of the crew's performance (as necessary) during the execution of the crew's self-assessment. The bases of this assessment shall be the Lesson Plan Notes, Team Work Rating Scale and the topics covered in the Lesson Plan. The comments from the Scenario Checklist should be detailed and focus on individual performance. The comments from the Team Work Rating Scale should be global and should be focused on the team as a whole.

The below are examples that may be used during the assessment:

a. Control Room formality
b. Actions taken and differences from expected actions.
c. Procedural use and compliance.
d. Attentiveness to control panels and indications.
e. Teamwork and communications.
f. Meeting the Learning Objectives.
g. Logkeeping
h. Understanding plant/system response.
i. Diagnosis of events/conditions
j. Recognize progress and good performance.
k. Compliance/use of Technical Specifications.
l. Supervisory control.
m. Emergency plan implementation.
n. Notifications and administrative requirements.
o. Self verification techniques
p. Conservative approach to reactor safety
(NCTS 5) q. Realism

Summarize any performance weaknesses or trainees misconceptions and provide guidance or training to correct these weaknesses. Any questions asked during the scenario should be reviewed with the entire crew.

4. Questions raised during the assessments, or at any time during the training session, that cannot be immediately answered should be researched and answered before the end of the day, if possible. If the answer is found after the training cycle is completed, bring the questions and the answer to the program coordinator for disposition.

5. Questions concerning interpretations of procedural steps, technical specifications or station policy will be answered by contacting the responsible station management person and relaying the answer to the crew. For further clarification, it may be necessary to complete the appropriate plant/simulator documentation.

6. Video taping may be used to enhance the crew's strengths and weakness.

(NCTS 3)