NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

SIMULATOR LESSON PLAN

02-REQ-009-TRA-2-37 Revision 0

TITLE: SIMULATOR TRAINING FOR EOP RP, C2 and C3

	SIGNATURE	DATE
PREPARED BY		5/23/91
VALIDATED BY		5/23/91
SUPERVISOR OPS. TRAINING		5/28/91
PLANT SUPERVISOR/ USER GROUP SUPERVISOR		5/31/91

Summary of Pages

(Effective Date: 5/31/91)

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TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

VERIFICATION: _____ _____

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4/29/99

ATTACHMENT 5

LESSON PLAN TEMPORARY/PUBLICATION/ADDENDUM CHANGE FORM

The attached change was made to:

Lesson plan title: Sim TRAining for EOP - RP, C2, C3

Lesson plan number: 02-REQ-029-TRA-2-37

Name of instructor initiating change: Eric D Perry

Reason for the change: To correct the simulator setup section.

Type of change:

1. Temporary change ____
2. Publication change X
3. Addendum change ____

Disposition:

X 1. Incorporate this change during the next scheduled revision.

____ 2. Begin revising the lesson plan immediately. Supervisor initiate the process.

____ 3. To be used one time only.

Approvals:

Instructor: Eric D Perry /Date 6/17/91

Supervisor Operations Training (or designee): [signature] /Date 6/17/91

A. TRAINING DESCRIPTION

1. Title of Lesson Plan: Simulator Training for EOP RP, C2 and C3
2. Estimated Duration of Lesson: 2 hours
3. Prerequisites:
   a. Instructor:
      Qualified in accordance with NTP-16.
   b. Trainees:
      Meet eligibility requirements per 10CFR55.
4. References:
   a. N2-OP-3, Condensate and Feedwater
   b. N2-OP-11, Service Water System
   c. N2-OP-13, Reactor Building Closed Loop Cooling
   d. N2-OP-14, Turbine Building Closed Loop Cooling
   e. N2-OP-29, Reactor Recirculation System
   f. N2-OP-31, Residual Heat Removal System
   g. N2-OP-34, Nuclear Boiler, Automatic Depressurization and Safety Relief Valves
   h. N2-OP-71, 13.8 KV/4160V/600V A.C. Power Distribution
   i. N2-OP-72, Standby and Emergency A.C. Distribution System
   j. N2-OP-100A, Standby Diesel Generators
   k. N2-OP-100B, HPCS Diesel Generator
   l. N2-OP-101C, Plant Shutdown
   m. N2-OP-101D, Power Changes
   n. N2-EOP-RPV, Pressure Control
   o. N2-EOP-C2, Emergency Depressurization
   p. N2-EOP-C3, Steam Cooling
   q. NMP2 EOP Basis Document
5. Manipulations Performed:
   a. O2-REQ-MAN-A11-2-00, Loss of Electric Power/Degrade Sources
   b. O2-REQ-MAN-A12-2-00, Loss of Core Coolant Flow/Natural Circulation
   c. O2-REQ-MAN-A14-2-00, 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 IC-20
2. Change the simulator conditions as follows:
   a. Post 80-100% rod line
3. Presets
   a. Preset Malfunction:
      1,CS03 HPCS DG Fails to Start
      2,DG01C Div. II DG Fails to Start
      3,SL02 SLC Pumps Fail to Start
   b. Preset I/O's:
      None
   c. Preset Remotes:
      None
4. Place the C RFP in PTL, and hang red markup reference tags. shut FW03 mod 47C and 84C
5. Simulator set-up to be saved in a stored IC.
6. Initialize to IC-20.
7. Presets
   a. Preset Malfunctions
      1,CS03 HPCS DG Fails to Start
      2,SL02 SLC Pumps Fails to Start
      3,DG01C Div. II DG Fails to Start
8. Directions
   a. Go to run
   b. Enter Malf. 4, FW03A a feed pump trips.
   c. When the FCV runback is complete perform the actions per OP-29 to reset the runback.
   d. Enter Malf. 5, ED02 loss of 115 KV.
   e. Place mode switch in shutdown and perform scram actions.
   f. Enter Malf. 6,DG02A Div. I DG trips.
   g. Enter Malf. 7,RC06 RCIC Turbine Trips.
   h. Place the ADS Inhibit Switches to ON.
   i. Allow the machine to run until RPV water level is -10 to -14 inches then go to freeze.
   j. Snapshot to IC 31.

E. POSITION ASSIGNMENTS

Allow the SSS to decide.

F. SCENARIO SUMMARY

The purpose of this training session is to review the RP leg of EOP RPV Control, Steam Cooling and Emergency Depressurization. The scenario begins with the crew operating at full power. Once the crew assumes the shift the A Feed Water pump will trip resulting in a Recirc Flow Control Valve Runback. Next the crew will be driven to manually scram the reactor due to a loss of off-site power with a failure of Div. II and III diesels. When the crew has stabilized pressure and level the scenario will stop for a review of the EOP steps performed.

The crew will resume operations just prior to entering steam cooling. Plant conditions will be such that steam cooling is required. After the crew has re-entered RPV control due to high RPV pressure the scenario will be stopped for a review of the EOP steps performed.

The crew will resume operation in the steam cooling mode and take actions to emergency depressurize the plant when Div. II diesel is restored. The scenario will end when the crew is restoring RPV level.

G. LEARNING OBJECTIVES

1. Generic Objectives:

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

GO-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 CSO/NAOE in accordance with Operations Department Instruction.

GO-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.

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

2. Learning Objectives:

LO-1.0 Given a reactor plant operating at full power and a feed water pump trip with recirc flow control valve runback the operating crew will take action to maintain RPV level above 159.3 and reset the FCV runback.

Tasks:

Ro: Perform the actions for a single feedwater pump trip. (2000270501)

RO: Perform the actions required for FCV runback and low speed recirc pump operation. (2029330401)

SRO: Direct the actions for a loss of individual feedwater systems. (3449210503)

LO-2.0 Given a reactor plant operating at approximately 65% with a loss of off-site power and a failure of the Div. II/III diesel generators operating crew will perform a manual reactor scram, initiate RCIC to stabilize RPV level above level 1 and operate RCIC/SRV's to stabilize RPV pressure below 1037 psig.

Tasks:

RO: Perform the actions required for a loss of off-site power. (2000350501)

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

RO: Scram the reactor manually and take immediate actions. (2010130101)

RO: Perform the action required for FCV runback and low speed recirc pump operation. (2029330401)

RO: Manually initiate the RCIC System from the Control Room and monitor for proper operation. (2170030101)

SRO: Respond to a loss of off-site power with the unit on line. (3449400503)

SRO: Direct the action required per EOP-RPV Section RP. (3449410603)

LO-3.0 Given a shutdown reactor plant with no injection sources available and RPV level approaching top of active fuel the operating crew will perform actions in accordance with EOP-C3 to maintain fuel temperature below 1800°F.

Tasks:

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

SRO: Direct the action required per EOP-C3, Steam Cooling. (3449530603)

LO-4.0 Given a shutdown reactor plant maintaining fuel temperature below 1800°F using steam cooling with an injection source available, the operating crew will take action to emergency depressurize the reactor and commence injection to the RPV.

Tasks:

RO: Perform the action required for an automatic initiate of LPCI. (2059450101)

RO: Manually initiate the ADS System and monitor while activated. (2180020101)

RO: Conduct ADS manual valve operation and monitor indication. (2180030201)

SRO: Direct the actions required per EOP-C2, Emergency Depressurization. (3449520603)

LO-5.0 Given EOP-RPV control Section RP the operating crew will be able to discuss the basis for each step in accordance with the N2-EOP Basis Document

Tasks:

RO: Perform the actions required for a high reactor pressure. (2000180501)

SRO: Direct the actions required per EOP-RPV Section RP. (3449410603)

LO-6.0 Given EOP-C3 the operating crew will be able to discuss the basis for each step in accordance with the N2-EOP-Basis Document.

Tasks:

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

SRO: Direct the actions required per EOP-C3, Steam Cooling. (3449530603)

LO-7.0 Given EOP-C2 the operating crew will be able to discuss the basis for each step in accordance with the N2-EOP Basis Document.

Tasks:

RO: Conduct ADS manual valve operation and monitor indication. (2180030201)

SRO: Direct the actions required per EOP-C2, Emergency Depressurization. (3449520603)

H. LESSONS LEARNED

1. None

I. TURNOVER INFORMATION

1. Give the following information for initial conditions:

   Core Life: Beginning of Life

   Description: Plant operating at full power between the 80-100% rod line.

   Rod Sequence Information: Step 84

   Plant Conditions: 100% power

2. Tech. Spec. limitations in effect:

   None

3. Significant problems/abnormalities:

   a. C RFP marked up

4. Evolutions/maintenance for the on-coming shift:

   a. C RFP seal replacement

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: 4,FW03A-"A" FW pump trips on electrical fault. When RPV level is at L4 a RR FCV runback occurs.	SSS/ASSS: a. Direct CSO/E to monitor RPV level. b. Direct CSO/E to monitor the recirc runback. CSO/E: a. Verify runback reduces power to within the capacity of 1 feed pump by reporting level is restoring to the programmed band. b. Report that core flow is not in the restricted zone.		Obj. 1

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Role Play: Make reports on feed pump status. The breaker tripped on overcurrent. The feed pump motor is extremely hot to the touch.	SSS/ASSS: a. Direct water level restoration. b. Direct investigation of feed pump. c. Direct power be maintained below 65%. CSO/E a. Dispatch aux. operators to investigate a "A" FW pump. b. Verify/place loop controllers in manual. c. Zero the limiter error using loop controller. d. Verify the servo error is nulled and loop controller M/A station output is about 35%. e. Reset the runback by depressing the FW pump trip interlock reset pushbutton on P602.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
When crew actions are complete for the FCV runback.			
4. Enter malfunction: 5,ED02 loss of off site 115KV power source.	CREW: a. Identify and report the loss of off-site power. b. Identify and report the failure of Div. II and III diesel generators to start. c. Report that Div. I diesel started and loads have sequenced on.		Obj. 2
Role Play: As power control report that you have dispatched personnel to investigate the loss of power.	CSO/E: a. Report high temperatures on CCP/CCS Systems.		
NOTE: Operators should not restore service water to CCS and CCP with the current plant condition.	ASSS: a. Direct recirc flow lowered to minimum. b. Direct preparations for a reactor scram.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	CSO/E: a. Reduce recirc to minimum.		
5. As the crew manually scrams the reactor insert malfunction 6,TC02 EHC press. regulator failure causes TCV's and TBV's to close. RPV pressure increases.	SSS/ASSS: a. Direct mode switch to shutdown.		
	CSO/E: a. Places mode switch in shutdown. b. Reports all rods in. c. Recognizes and reports RPV pressure increasing.		
	SSS/ASSS: a. Enter RPV control on high RPV pressure. b. Directs CSO/E to maintain pressure using SRV's and RCIC. c. Directs RCIC initiated to maintain RPV level.		

J. SCENARIO

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	CSO/E: a. Manually initiates RCIC by arming & depressing the initiation pushbutton. b. Verifies/reports RCIC injecting. c. Maintains pressure using SRV's and RCIC in the ordered band.		
When crew has stabilized level and pressure go to freeze. Using the EOP Bases Document and the simulator conditions have the crew answer the following.			Obj. 5
Q: Why do we prevent LPCS/LPCI injection prior to depressurizing if not needed for adequate core cooling.	A: Prevents an uncontrolled flood up or power excursion due to injection.		
Q: Why do we have a step that allows us to anticipate emergency depressurization.	A: Allows us to discharge as much heat to an possible to the main condenser.		
Q: What defines a cycling SRV.	A: Multiple, closely sequenced valve actuations.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Q: If SRV's are cycling why do we want to take manual control.	A: To minimize dynamic loads, to minimize RPV level fluctuations and to minimize the challenge to SRV operability.		
Q: Why does RP direct a pressure reduction to 960 psig.	A: So the TBV's will pass 100% of the bypass valve capability. If MSIV's are closed it provides adequate margin below the SRV lift point.		
Review the definition of HCTL and discuss how the HCTL override applies.			

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
The HEAT CAPACITY TEMPERATURE LIMIT is defined to be the highest suppression pool temperature at which initiation of RPV depressurization will not result in exceeding either (1) the suppression chamber design temperature or (2) the Primary Containment Pressure Limit before the rate of energy transfer from the RPV to the containment is within the capacity of the containment vent. This temperature is a function of RPV pressure, and the limit is utilized to preclude failure of the containment or equipment necessary for the safe shutdown of the plant.			
Review the use of the override that allows MSIV's to be re-opened during an ATWS.			
- Review the systems listed in section RP for pressure control. Discuss which modes are currently available for the given conditions.			

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
- Discuss how the first stop sign ensures depressurization and cooldown will not proceed until the Rx is shutdown.			
6. Have the crew prepare to resume the scenario.			
7. Reset the simulator to prepared IC #31.			
8. Conditions are as follows: - RCIC turbine has tripped. - RPV level is approaching -14 inches on fuel zone. - No sources are available for injection. - Level control is by EOP C-1 and you are at the wait statement prior to steam cooling. - No Diesel Generators are running.	CREW: Assume the shift.		
9. RPV level -14 inches.	SSS/ASSS: a. Exits section RP and enters EOP-C3 stem cooling. b. Directs CSO/E to return SRV's to auto.		Obj. 3

J. SCENARIO

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
10. When RPV pressure exceed 1037 psig. (Note: No action required. Discuss if required the definition of cycling SRV.)	SSS/ASSS: a. Re-enter RPV control on high RPV pressure.		
Go to Freeze			
Q: What are the consequences of remaining in steam cooling when level cannot be determined.	A: Fuel Damage		Obj. 6
Q: Why do we depressurize once an injection source is line up.	A: Allows us to maximize injection flow.		
Q: How is heat transfer maintained in steam cooling.	A: Steam flowing thru the uncovered portion of the core.		
- Review the definition of minimum zero inj. water level. Defined as the lowest RPV water level at which the covered portion of the core will generate sufficient stem to preclude any clad temperature in the uncovered portion from exceeding 1800°F.			

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
- Discuss the consequences of depressurizing before/or after -55 inches.			
11. Have the crew prepare to resume the scenario. Inform them that Div. II power will be restored.			
12. Clear malfunction 2. Div. II DG starts and supplies the bus.	CREW: a. Recognize power restored to Div. II.		Obj. 4
	CSO/E: a. Report RHR B & C pumps are running.		
	SSS/ASSS: a. Exits EOP C-3 and enters EOP C-2. b. Directs CSO/E to open 7 ADS valves.		
	CSO/E: a. Opens 7 ADS valves. b. Reports RPV pressure lowering.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
	c. Reports RHR B/C injecting when pressure lowers. SSS/ASSS: a. Exits EOP-C1 and enters EOP-RL at point A. b. Exits EOP-C2 and enters EOP-RP at C. c. Directs CSO/E to restore level 159.3 to 202.3.		
13. Go to Freeze when new level bound ordered.			Obj. 7
Q: If rods were not inserted why are we allowed to continue injecting with RCIC when we emergency depressurize.	A: Operations of RCIC aids in depressurization and its injection flow is small.		
Q: Why must suppression pool level be above El. 192 ft.	A: Ensure SRV T-Quenchers are submerged.		
Q: What would happen if emergency depressurization was performed with level below El. 192 ft.	A: Primary containment design pressure may be exceeded.		

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
Q: Why are the ADS SRV's preferred.	A: They are considered the most reliable because of their qualification and the location of their discharge T-quenchers uniformly distributes the heat load.		
Q: Why do we desire a minimum of 4 SRV's to be opened.	A: There is sufficient steam flow to remove all they decay heat at a pressure low enough that the ECCS pumps will provide makeup for all steam flow.		
14. Review alternate methods to depressurize per EOP-C2.			
15. Review the second wait statement, discuss how this works in conjunction with EOP-C5, Power Level Control.			
16. Review the actions in EOP-RP when you re-enter at point C.			

INSTRUCTOR INFORMATION/ INSTRUCTOR ACTIVITIES	EXPECTED STUDENT RESPONSE	SAT/UNSAT/NA	COMMENTS
17. With remaining time, allow the crew to complete recovery action or perform portions of the scenario over again.			
18. Review 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 focused 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 question 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 weaknesses.

(NCTS 3)