

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

02-REQ-009-IDY-2-05 Revision 4

TITLE: ATWS FOLLOWING A TURBINE TRIP WITHOUT BYPASS VALVES

PREPARED BY

VALIDATED BY

UNIT OPERATIONS
TRAINING SUPERVISOR

PLANT SUPERVISOR/
USER GROUP SUPERVISOR

SIGNATURE

DATE

[Signature]

11/16/90

B Shift (Rev 2)

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Summary of Pages

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1 - 20

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

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I. TRAINING DESCRIPTION

- A. Title of Lesson: ATWS Following a Turbine Trip Without Bypass Valves
- B. Lesson Description: While operating at 100% power, the CRD flow control valve goes shut. Other than the indicated loss of flow, a control rod drive high temperature alarm will eventually alert the Operators.

The 1B feedwater heater tubes rupture resulting in a heater string isolation. Once the isolation is complete, the turbine begins to lose vacuum due to a boot rip. The loss of vacuum causes a turbine trip, but the turbine bypass valves fail to open.

The control rods fail to insert following the turbine trip. They do not respond to manual scram or RRCS signals. The operators enter and execute EOPs RP, RL, and RQ as well as the appropriate off normal procedures. As suppression pool temperature approaches SLC injection limits and appropriate actions are being taken to drive control rods, the scram capability is restored and the rods go in.

- C. Estimate of the Duration of the Lesson: 50 minutes
- D. Method of Evaluation, Grade Format, and Standard of Evaluation: Satisfactory completion of Simulator Evaluation performed in accordance with Nuclear Training Instruction 4.3.6.
- E. Prerequisites:
 - 1. Instructor:
 - a. Qualified in accordance with NTP-16.1.
 - 2. Trainee:
 - a. Meet eligibility requirements per 10CFR55, or
 - b. Be recommended for this training by the Operations Superintendent, his designee, or the Training Superintendent.



F. References:

1. N2-OP-8, Feedwater Heaters and Extraction Steam System
2. N2-OP-9, Condenser Air Removal System
3. N2-OP-30, Control Rod Drive
4. N2-OP-31, Residual Heat Removal System
5. N2-OP-101C, Plant Shutdown
6. N2-OP-101D, Power Changes
7. N2-EOP's
8. EAP-2, Classification of Emergency Conditions
9. EPP-20, Emergency Notifications

II. REQUIREMENTS

- A. 10CFR55.45 and 55.49
- B. NUREG 1021



III. SCENARIO OBJECTIVES/ISCT Summary

Critical Task

- ISCT #1 Respond to a rising feedwater heater level (3449040403).
(SSS) K/A 295001 Gen. 15-3.8
- ISCT #2 Perform the actions required for a loss of feedwater heating
(CSO/E) (2439070101).
 K/A 259001 A2.02-3.1
- ISCT #3. Direct the actions required per EOP-RPV Section RQ (3449390603).
(SSS) K/A 295006 Gen 12-4.4
 Direct the actions required per EOP-RPV Section RL (3449400603).
 K/A 295006 Gen 12-4.4
 Direct the actions required per EOP-RPV Section RP (3449410603).
 K/A 295006 Gen 12-4.4
- ISCT #4. Perform the actions required for an anticipated trip without scram
(CSO/E) (2000200501).
 K/A 295037 Gen. 11-4.4
- ISCT #5. Direct the actions required per EOP-C5, Level/power control
(SSS) (3449570603).
 K/A 295037 Gen 12-4.6
- ISCT #6. Direct the actions required per EOP-PC Section SPT (3449450603).
(SSS) K/A 295013 Gen 12-4.2 .
- ISCT #7. Perform the actions required for an anticipated trip without
(CSO/E) scram (2000200501).
 K/A 295037 EA1.01-4.6
- ISCT #8. Perform the actions required for an anticipated trip without
(CSO/E) scram (2000200501).
 K/A 295037 EA1.11-3.5
- ISCT #9. Perform the actions required for a safety relief valve opening.
(CSO/E) (2000260501).
 K/A 239002 A4.04-4.3
- ISCT #10. Perform the actions required for an anticipated trip without
(CSO/E) scram (2000200501).
 K/A 295037 Gen 10-3.9
- ISCT #11. Perform the actions required for an anticipated trip without
(CSO/E) scram (2000200501).
 K/A 295037 Gen 10-3.9
- ISCT #12. Perform the actions required for an anticipated trip without
(CSO/E) scram (2000200501).
 K/A 295037 Gen 10-3.9



ISCT #13. Scram the reactor manually and take immediate actions (2010130101).
(CSO/E) K/A 295037 EA1.01-4.6

ISCT #14. Classify emergency events requiring emergency plan implementation
(SSS/ASSS) (3440190303).
K/A 294000 A1.16-4.7

ISCT #15. Ensure required notifications of on-site and off-site personnel
(SSS/ASSS) normal events (3440390303).
K/A 294001 A1.16-4.7



ATTACHMENT 1
PRE-EVALUATION BRIEFING

IV. LESSON CONTENT
LESSON CONTENT

DELIVERY NOTES

OBJECTIVES/
NOTES

1. Establish simulator initial conditions.
2. Bring crew into the classroom and brief using Attachment 6, Simulator Briefing Checklist.
3. Identify the roles and responsibilities and individuals performing the function for:
 - a. Crew Evaluator
 - b. SRO Evaluator
 - c. RO Evaluator(s)
 - d. Console Operator
 - e. If NRC is present introduce the NRC participants.
4. Identify the roles of the participants.
 - a. SSS
 - b. ASSS
 - c. CSO
 - d. AOE's
 - e. SEPC (if applicable)
5. Ensure video tape is running and participants are aware:
(NCTS-2)
 - a. That video taping is being conducted.
 - b. The reason for the video tape..

Discuss each item on the checklist.
This checklist should be discussed during the first evaluated lesson plan during a training week and prior to subsequent evaluated lesson plans as necessary.

Ensure the participants understand that the evaluators will be taking extensive notes during the session and not to be concerned with the evaluators actions.



ATTACHMENT 1
PRE-EVALUATION BRIEFING

LESSON CONTENT

DELIVERY NOTES

OBJECTIVES/
NOTES

6. Refer to Attachment 2, Section C. Turnover information and conduct shift turnover in the simulator.



TIME

EVENT

INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

ATTACHMENT 2

Special Instructions:

Markup as out-of-service:

None

Simulator Operation:

Initialize: IC-20

100%, BOL

Preset Malfunctions:

2,TC06

TBV Fail Closed

3,RD17,15

Control Rqds Stuck

Preset Remote Functions:

None

Preset Instructor Overrides:

None

Distribute and discuss

Turnover sheets

Initial Conditions:

100%, BOL, maintaining

power in OP-101A

RWM GR-147



TIME	EVENT	INSTRUCTOR ACTIVITY	ATTACHMENT 2 (Continued) PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		<p>Out-of-service equipment:</p> <p><u>Remote Shutdown Room ACU-3B</u></p> <p>(Division II) has just been placed in PTL due to receipt of overcurrent trips on the breaker. Maintenance is investigating. No follow-up actions have yet been performed.</p> <p>Surveillances scheduled:</p> <p>None</p> <p>Allow not more than five minutes for panel walkdown.</p>		<p>Walk panels.</p>	
T = 0		Commence scenario.		<p>Assume the shift; continue power operation.</p> <p>SSS/ASSS</p> <p>Consult Tech Specs for ACU-3B operability.</p> <p>Review Tech Spec interpretation #25. Ensure Div II remote shutdown room temp <90°F. (Action 2)</p>	Sat/Unsat/NA



ATTACHMENT 2 (C-10)

TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 4	1	Enter malfunction 1,RO14A	CRD FCV shuts		
T = 7			603-316, CRD high temp.	RO Report/respond to alarm	1a,6a Sat/Unsat/NA
		ROLE PLAY: As AOE, place standby flow control valve in service. Spend an appropriate amount of time before reporting the swap. (OP-30, F.4; remote operation)		CSO/E Locate and use OP-30, I.8.0 Requests AOE to swap CRD flow control valves	6a,b Sat/Unsat/NA
		Set Remote Function CRD Flow Ctl Vlv Select to B RD2; 1		RO Checks CRD parameters for normal values	4b Sat/Unsat/NA
T = 9		Set Malfunction Feedwater Heater 2B Tube Leak MF; 4,FW22B1			
T = 11 T = 13	2	Malfunction 4 causes alarms	1st Pt Htr High Htr Drn Pp Trip 4th Pt Htr High Lvl.	CSO/E Report/respond to alarms:	Sat/Unsat/NA



TIME	EVENT	INSTRUCTOR ACTIVITY	ATTACHMENT 2 (Continued) PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 14			6th Pt Emer Drn Open	SSS Direct actions for a loss of feedwater heating OP-8, H.3.0	ISCT #1 Sat/Unsat/NA
T = 15				CSO/E Locate and use OP-8, H.3.0 1. Determine which heater string is high-high by computer points. 2. Verify automatic actions HDL pump trips Heater string isolates Disch closed CNM-33B(A,C) Inlet closed CNM-32B(A,C)	Sat/Unsat/NA Sat/Unsat/NA
		Set Malfunction Main Condenser Air Inleakage..... MF; 5,MC01,100,3			



TIME EVENT INSTRUCTOR ACTIVITY ATTACHMENT 2 ()d)
PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

- | | | |
|---|-----------------|--------------|
| 3. Reduce power with
recirc to $\leq 70\%$. | ISCT #2
5a,b | Sat/Unsat/NA |
| 4. Verify feed temp normal
for new power level | 4a | Sat/Unsat/NA |
| 5. Verify reactor level
normal | 4a | Sat/Unsat/NA |
| 6. Determine cause | 2c | Sat/Unsat/NA |
| 7. Notify reactor analyst | | Sat/Unsat/NA |

T = 24 Vacuum decrease should be
noticeable

TEAM

Report/respond to loss of main condenser vacuum	1a,6a	Sat/Unsat/NA
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T = 26 Low vacuum alarm

SSS

Direct actions for a loss of condenser vacuum.		Sat/Unsat/NA
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ATTACHMENT 2 (Continued)
PLANT RESPONSE

TIME

EVENT

INSTRUCTOR ACTIVITY

OPERATOR ACTIONS

EVALUATOR COMMENTS

NOTE: If team tries a manual
scram prior to vacuum induced
turbine trip, set Malfunction
Spurious Main Turbine Trip
MF; 6,TU07

Team

Located and use OP-9, H.2.0

- | | | |
|--|---------|--------------|
| 1. Notify SSS and Rx Analyst | 6a | Sat/Unsat/NA |
| 2. Reduce recirc to minimum or until vacuum stabilizes | 4a,5a,b | Sat/Unsat/NA |
| 3. Insert rods in sequence or as Rx Analyst directs | 5a,b | Sat/Unsat/NA |

T = 28

3

Turbine trip and scram;
bypass valves fail shut

SSS/ASSS

ISCT #3

- | | | |
|--|----|--------------|
| Enter EOP-RPV control:
execute RP, RL, RQ
concurrently | 6a | Sat/Unsat/NA |
|--|----|--------------|

CSO/E

Performs actions of OP-101C, 4b

H.1.0

- | | | |
|---|------|--------------|
| 1. Mode switch to S/D | 5a,b | Sat/Unsat/NA |
| 2. Ensure scram by verifying rod position | 4a | Sat/Unsat/NA |



ATTACHMENT 2 (C-10)					
TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR-COMMENTS
	4		ATWS	3. Reports failure to scram	ISCT #4 4a Sat/Unsat/NA
				4. Verify/report APRMs.	4a Sat/Unsat/NA
				SSS	
				1. Exit RL and enter C-5. a. Directs ADS logic inhibit to on. b. Directs action per C-5 to maintain level.	ISCT #5 Sat/Unsat/NA Sat/Unsat/NA
				2. Directs pressure control using SRV's.	Sat/Unsat/NA
				3. Directs actions of RQ a. Verify ARI initiated. b. Direct RR pumps tripped. c. Direct actions per EOP-6 attachment 14 to insert rods.	Sat/Unsat/NA Sat/Unsat/NA Sat/Unsat/NA
				4. Enters PC control when SP temp above 90°F: Executes DHT, SPL, PCP, PCH and SPT concurrently.	ISCT #6 Sat/Unsat/NA



ATTACHMENT 2 (Cont'd)
PLANT RESPONSE

TIME	EVENT	INSTRUCTOR ACTIVITY	OPERATOR ACTIONS	EVALUATOR COMMENTS
			a. Orders SP cooling initiated.	Sat/Unsat/NA
			b. Orders SBTG placed on the drywell.	Sat/Unsat/NA
		ROLE PLAY: As I&C report it will take a minute or two To bypass RSCS	CSO/E	
		Set Malfunction: MF; 7,RW02	1. Insert rods in accordance with RQ and EOP-6 Attachment 14.	4b Sat/Unsat/NA
		Then report RSCS bypass accomplished	2. Reset RPS to allow SDV to drain.	ISCT #7 Sat/Unsat/NA
		Note: To "reset" the scram by jumpering out, insert (when asked): MF; 8,RP02 MF; 9,RP14	3. Place ADS inhibit switches to on.	ISCT #8 Sat/Unsat/NA

TIME	EVENT	INSTRUCTOR ACTIVITY	ATTACHMENT 2 (C-100) PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		Clear MF; 3, after the scram has been reset.	Performs in order: #1 = PSV 128 #2 = PSV 133 #3 = PSV 123 #4 = PSV 124 etc.	4. RPV Press Control with SRVs a. Place keylock to OPEN b. Monitor pressure c. Place keylock to AUTO	5a,b Sat/Unsat/NA 4a Sat/Unsat/NA 5a,b Sat/Unsat/NA ISCT #9
				5. Place RHS in Supp Pool Cooling per OP-31	3b Sat/Unsat/NA
				6. Place SBTGT on the drywell in accordance with OP61A Section H.1.	Sat/Unsat/NA
				7. Monitor/Report: a. Reactor Pressure, Level, and power b. Drywell Pressure and Temperature c. Suppression Pool Temperature and level	2a,6a Sat/Unsat/NA Sat/Unsat/NA



TIME	EVENT	INSTRUCTOR ACTIVITY	ATTACHMENT 2 (continued) PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		Note: The SLC system will have initiated automatically. Check they verify this.		SSS Order SLC initiation before SPT reaches 110°F	6a Sat/Unsat/NA
				CSO/E	
				1. Initiates SLC manually (OP-36A.H.1) or verifies initiation	Sat/Unsat/NA
				2. Monitors/reports parameters	4a,6a
				a. Hdr press > reactor pressure	Sat/Unsat/NA
				b. Tank level decreasing	Sat/Unsat/NA
				c. Pump flow = 86 gpm (approx)	Sat/Unsat/NA
				3. Verify/report RWCU isolation	Sat/Unsat/NA
			SP temp is 110°F	SSS	
				1. Direct actions per EOP-C5 to lower RPV water level to reduce power.	3b,c Sat/Unsat/NA

TIME	EVENT	INSTRUCTOR ACTIVITY	ATTACHMENT 2 (Continued) PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
				CSO/E	
				1. Carry out actions directed by SSS.	
				2. Terminate and prevent	ISCT #10
			(*) a. Feedwater	ISCT#11	Sat/Unsat/NA
			(*) b. RCIC	ISCT#12	ISCT #11
			(*) c. HPCS	ISCT#13	Sat/Unsat/NA
			RPV water level lowers, reactor power lowers.	CSO/E	
				Reports RPV water level when power is below 4%.	Sat/Unsat/NA
				SSS	
				Directs water level to be maintained between -45 and the level at which power.	Sat/Unsat/NA
				CSO/E	
				1. Takes appropriate actions to maintain water level within the prescribed band.	Sat/Unsat/NA
			When scram discharge volume is drained crew will attempt another scram.	2. Report SDV drained.	ISCT #13



ATTACHMENT 2 (C-1d)
PLANT RESPONSE

TIME

EVENT

INSTRUCTOR ACTIVITY

OPERATOR ACTIONS

EVALUATOR-COMMENTS

3. Insert manual scram
after SDV level alarms
clear.

Sat/Unsat/NA

TEAM

Recognizes/reports rod
movement

2a;6a Sat/Unsat/NA

SSS/ASSS

Recognizes that rods are
inserting and has team
concentrate on restoring
level and controlling
pressure.

2b,c Sat/Unsat/NA

SSS/ASSS

1. Classifies event as
Site Area Emergency
(SLC initiated) due to
failure to complete
a scram.

2b,c Sat/Unsat/NA

ISCT #14

2. Makes notifications

ISCT #15

Sat/Unsat/NA

TERMINATION CUES:

When level is 159.3 to 202.3"
and press is <950 psig and being
controlled per EOP-RPV.



ATTACHMENT 3
POST EVALUATION ASSESSMENT

LESSON CONTENT

DELIVERY NOTES

OBJECTIVES/
NOTES

1. Ensure operators stand fast and do not communicate immediately after simulator is placed in freeze.
2. Evaluators should caucus to determine if any follow-up questions are necessary.
3. Ask follow-up questions before the SSS and crew is released.
4. Instruct the SSS to assess the session with the crew to determine crew strengths and areas for improvement. This should be documented in Attachment 4 for later evaluations.
5. Evaluation Team Shall:
 - a. Determine crew strengths and areas for improvement.
 - b. Conduct a crew evaluation in Attachment 13.
 - c. Determine SAT/UNSAT/NA for all critical tasks and who performed each task.
 - d. Conduct individual evaluations on Attachment 10 and 11.
6. Following the evaluation (if NRC is present) the results of evaluation should be given to the NRC examiners.
7. Conduct a post exercise assessment as follows:
 - a. Review the learning objectives.
Have the crew state how each was met during the session.



LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES
b. Participant Self-Evaluation	Allow participants to evaluate themselves against the learning objectives and tasks for the session. Discussion should center on performances and not personal feelings or interpretations of actions.	
<p>Discuss should focus on measurable behaviors and how these contributed to or detract from meeting the objectives.</p> <p>c. Instructor assessment and performance (NCTS-2) recommendations.</p>	<p>1. Assess the participants performance for those objectives and tasks not included in the crew self-assessment. Use the video tape in the assessment to more effectively assess communications, teamwork, and prioritization, if necessary.</p> <p>2. Provide feedback on ways to improve performance as appropriate.</p>	
8. Session and program feedback.	<p>1. Distribute Simulator Training Evaluation Feedback For, NTI-4.4 Attachment 13.</p> <p>2. Provide students with time to complete form.</p>	
9. Document session.	<p>1. Complete Post Evaluation Summary, Attachment 4.</p> <p>2. Place a copy in file for next training session.</p> <p>3. Document any NRC/INPO operating concerns as an items list attached to the training record. (TR)</p>	

