07-190-01

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

02-REQ-007-355-2-01 Revision 1

TITLE: VALVE MISPOSITIONING EVENTS INVOLVING HUMAN ERROR

	SIGNATURE	DATE
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Summary of Pages

(Effective Date: [illegible])

Number of Pages: 16

Date	Pages
June 1990	1 - 16

THIS LESSON PLAN IS A GENERAL REWRITE

MASTER CONTROLLED DOCUMENT

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

VERIFICATION: _____ _____

DATA ENTRY: _____ _____

RECORDS: _____ _____

9305030318

I. TRAINING DESCRIPTION

A. Title of Lesson: Valve Mispositioning Events Involving Human Error

B. Lesson Description:

1. Provide training on uniform valve positioning and position verification methods to prevent degradation of safety system functions and lost plant availability.

C. Estimate of the Duration of the Lesson: 2 hours

D. Method of Evaluation, Grade Format, and Standard of Evaluation: Open reference written exam and receive 80% or better score.

E. Method and Setting of Instruction: Classroom lecture

F. Prerequisites:

1. Instructor:

a. Demonstrated knowledge and skills in the subject, at or above the level to be achieved by the trainees, as evidenced by previous training or education, or

b. SRO license for Nine Mile Point Unit Two or a similar plant, or successful completion of SRO training including simulator certification at the SRO level for Nine Mile Point Unit Two.

c. Qualified in instructional skills as certified by NTP-16.

2. Trainee:

a. Meet eligibility requirements per 10CFR55
or

b. Be recommended for this training by the Operations Superintendent or his designee or the Training Superintendent.

G. References:

1. INPO SOER, 85-2, Valve Mispositioning Events Involving Human Error
2. LER 410-88-01, Rx Scram Due to a Loss of Feedwater Flow Caused by Personnel Error
3. N2-ODI-5.08 Operator Good Practices
4. NMP55509 Lessons Learned RWCU Transient
5. LER 89-33 WCS Isolation due to High NRHX outlet temperature
6. OR 89-149 Contamination in DFM Sump 5
7. NRC IN 83-55 Misapplication of Valves by Throttling Beyond Design Range

II. REQUIREMENTS

A. As recommended in INPO SOER 85-2, Valve Mispositioning Events Involving Human Error, Training Recommendations.

III. TRAINING MATERIALS

A. Instructor Materials:

1. Instructor copy of Lesson Plan
2. Whiteboard and Markers
3. Transparency package
4. Copy of SOER 85-2, Valve Mispositioning Events Involving Human Error
5. Copy of LER 88-01, Rx Scram Due to Loss of Feedwater Flow Caused by Personnel Error

B. Trainee Materials:

1. Copy of references listed in Sec. G
2. Copy of objectives

IV. EXAM AND MASTER ANSWER KEYS

Exams and answer keys are filed with requal records.

V. LEARNING OBJECTIVES

A. Terminal Objectives

The trainee will gain the knowledge to:

TO-1.0 Properly position and/or verify position of a valve in accordance with approved procedures or orders.

B. Enabling Objectives

EO-1.1 Given a case study event identify the contributing factors in each.

EO-1.2 State the alternate methods of determining valve position when the normal method is not available (valve inaccessible).

EO-1.3 State the method for verifying a manual valves is in the open position.

EO-1.4 State the method for verifying a manual valve is in the close position.

EO-1.5 State the method for verifying a manual valve is in a throttled position.

EO-1.6 State the method for verifying a manual is in the locked open position.

EO-1.7 State the method for verifying a manual valve is in a locked throttled position.

EO-1.8 State the actions required if a valve position discrepancy is found during a lineup.

EO-1.9 State the actions required if a procedural discrepancy is found during a lineup.

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LESSON CONTENT	DELIVERY NOTES	NOTES

I. INTRODUCTION

A. Purpose

1. Provide uniform methods of determining valve position and positioning valves.
2. Review valve mispositioning events and three effect on safety systems and plant availability.

B. Summary

1. Valve mispositioning events cause:
   a. Degradation of safety systems.
   b. Reduced plant availability.
2. Human error predominant cause.

C. Case Studies

1. Case A
   a. Event
      1) Safety related instrument isolation valves left closed following maint. — Filling Ref. legs
      2) Two valves found during review of operators rounds books.
      3) Third valve found when an alarm did not clear. — ATWS pressure transmitters read 0 psig during S/U-H/U and increase in pressure.
      4) Fourth valve found during restoration of third valve.

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b. Contributing Factors		EO-1.1
1) No formal work requests as required by procedures.	WR should have been generated.	
2) Valve check list not used.	All valve manipulation should be done using procedure or checklist. Human error.	
3) No post job valve lineup check.	Post maintenance error.	
4) Failure to recognize abnormal data during rounds log taking.	Should utilize normal band identified in log sheets. Two recent LERs involving this. (LER 89-16, 89-17)	
5) Log review inadequate.	Nimo will now use additional SRO to review logs. Human Error	
c. Effect		
1) Loss of one division of ATWS CKT.	T.S. inoperability.	
2. Case B		
a. Event		
1) Containment penetration valves not closed following maintenance.	Service air penetrations	
2) Found when oxygen concentration and nitrogen makeup were off normal.		
b. Contributing factors		EO-1.1
1) No entry made in locked valve log as required by procedure.	Procedural violation - Human error	

2) No drywell closeout procedure.	Close out procedure should cover valves manipulated during entry.	
3) No procedure directs valve closure.	Procedural discrepancy	
4) Startup checklists did not require lock valve check.	Procedural discrepancy	
c. Effect		
1) Potential containment leakage path.	Problem in Cond. 1, 2, 3	
3. Case C		
a. Event		
1) Test connection and inboard containment isolation valves left open by contractor.	Newly installed DBA recombiner	
2) Found during torus inspection while operating.	Noticed air flow through test connection.	
b. Contributing factors		EO-1.1
1) Lack of coordination between construction contractor and operations personnel.	Inadequate markup procedure.	
2) Plant operator placed tags on wrong valves.	In attention to detail - Human error. (NMP2 requires two Operators checking markup accuracy and hanging.)	
3) No identification tags on valves.	Being addressed at both units.	

4) System alignment verification waived at work completion - superintendent thought the check would be on pre-startup check sheet.

5) Valves not included on pre-startup checklist. — Procedural discrepancy

c. Effect

1) Containment leakage path. — Problem in mode 1, 2, 3

4. Case D

a. Event

1) Cooling FCV left closed and tagged after maintenance on heat exchanger. — Cooling water from containment spray.

2) Found during non-routine flow balancing test. — Noticed hold tag still hanging on valve during non related surv.

b. Contributing factors — EO-1.1

1) No administrative procedure to account for hold notice tags. — Poor procedure control.

2) Operability check of cooling water side of heat exchanger not required by post-maintenance procedure. — Post maintenance testing.

3) Valve not included on pre-startup checklist.	Procedural discrepancy	
4) Routine surveillance failed to detect mispositioned valve.	Missed valve - human error.	
c. Effect		
1) Unavailability of cooling for one of two primary containment spray systems.	T.S. inoperability	
5. LER 88-01		
a. Event		
1) Incorrectly determined standby prefilter lineup in IAS.		
2) Valved out on line prefilter.	Air pressure loss caused FWP min flow valves failed open causing loss of feed.	
3) Found error when air pressure decayed and caused scram.		
b. Contributing factors		EO-1.1
1) Operator improperly verified valve position by observing stem length.	Stem position only used if marked.	
6. LER 89-33		
a. Event		
1) Manual valves mis-positioned.		
2) Filter-Demin placed in service.		

3) Reactor Water discharge to Phase Separators.

b) Contributing Factors

1) Manual valves operated/put in abnormal line-up without;
-notifying SSS of specific status
-procedural controls
-Administrative controls (mark-up/hold-out)
-Log entry
-Turnover notification

7. NRC IN 83-55

a. Events

1) RHR System throttle valves throttled near closed in shutdown cooling mode.

b. Contributing Factors

1) Finer control of RPV temperature needed.

c. Effect

1) Excessive vibrations resulted in valve and support damage.

8. OR 89-149

a. Event

1) Following maintenance on an acid valve, acid pit washdown fills sump 5.

2) High level signal on sump 5 prompts pumping of sump 5.

3) When sump 5 pump secured with pumping line-up still lined up backflow occurs into sump 5.

4) Contamination is found in sump 5.

b. Contributing Factors

1) Known leaking check valve (modification previously submitted).

2) Higher priority pre-start mods preempted check valve/ tank mod.

c. Effect

1) Release of radioactive effluents outside restricted area.

Refer trainees to their copy of OR-89-149 Root Cause report.

D. Position Verification

a. Position verification is required in three instances:
-Equipment markups
-Valve lineups
-Procedural steps

Refer Trainees to their copy of N2-ODI-5.08.

b. Equipment markups require the greatest amount of control in the verification process. For markup, valve positions shall be checked as follows:

1. Identify the valve.
2. Visually inspect the valve to develop an initial determination of its position.
   -Use all your knowledge of valve construction system operation, system parameters etc. to aid in determining the valves position.
   -Can you see the shiny part of the stem that the packing has rubbed against? (meaning the valve is probably NOT shut)
   -Are the stem threads fully inserted? (meaning the valve is probably not open)
   -Is there a differential pressure across the valve?

EO-1.2

-Is there a differential temperature across the valve? EO-1.2

-Can you hear a flow? EO-1.2

-Is there a position indicator installed?

3. Check the local and/or remote indicating light indication. EO-1.3, 1.4

4. If specified by the markup, remove the control power fuses.

5. If a local stem position indicator is present, verify the position by using the local indicator. This step is sufficient to verify the valve position. EO-1.5 1.6, 1.7

NOTE: The following step does not apply to throttled valves.

6. If no stem position indicator is available and with concurrence of the person directing the position check, rotate the valve operator in the shut direction and observe the stem for movement.

CAUTION: Never check a valve by moving it in the open direction by the SSS.

-Exercise caution when moving the operators of 1/4 turn valves (such as ball and butterfly valves) to prevent stopping flow. Be aware that slight rotation can drastically effect flow.

7. Valves that are throttled should not be checked by physical rotation unless specifically directed to. These valves are checked by the stem position indicator and by using every other means except physical rotation. Inform the SSS and obtain guidance if a position indicator is not installed on a throttle valve. EO-1.5 1.7

   a. Position verification for valve lineups and procedural steps should follow the same methodology as for markups except that remote indicating lights are sufficient to verify the value position.

   b. In those cases where a procedure specifically addresses an alternate method of valve position verification, "Hands On" position verification is not required. EO-1.1

c. The SSS shall resolve any discrepancies in valve position verification. EO-1.8 1.9

E. Valve Operations

1. Manual Operation

Personnel performing valve operations should be familiar with the system being operated to the extent that they know what is supposed to happen after the valve manipulation (am I starting flow?, am I throttling cooling water to change temperature?, is the temperature changing as I expected it to?).

The operator must have "positive control" of the valve being operated until conditions have stabilized. This allows the operator the opportunity to stop what was started quickly if required. (Example: When starting flow, the valve should first be "cracked open", with the Operator's hands on the valve until it is determined that positive control is no longer required. Once the expected system response is verified, the valve can then be fully opened.)

The force exerted on hand-wheels should always be evenly applied to prevent shafts and stems from being damaged.

Valve operator devices (such as "cheaters" or crow bars) that could exert excessive force on a valve component shall never be used. Whenever difficulty is experienced in operating a valve, the Control Room should be notified and the SSS should be consulted.

Valves that are being shut should be "seated" snugly unless specific direction is given otherwise.

Whenever valves are opened (disc and gate type), the handwheel/operator should be "backed-off" the fully open position approximately 1/4 turn. This is intended to prevent binding of valve component internals and to increase the likelihood of correct position verification during position checks.

Valve backseats should only be used when specifically referred to in a procedure or as directed by the SSS. All discrepancies found concerning a valve's condition or operability should be addressed by submitting a work request.

II. REVIEW

A. Review Objectives

B. Ask/Answer question