

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-265/90024(DRP)

Docket No. 50-265

License No. DPR-30

Licensee: Commonwealth Edison Company  
Opus West III  
1400 Opus Place  
Downers Grove, IL 60515

Facility Name: Quad Cities Nuclear Power Station, Unit 2

Meeting At: Region III Office, Glen Ellyn, IL 60137

Meeting Conducted: December 7, 1990

Type of Meeting: Enforcement Conference

Approved By:

W D Shafer  
Wayne D. Shafer, Chief  
Reactor Projects, Branch 1

12-18-90  
Date

Meeting Summary

Meeting On December 7, 1990 (Report No. 50-265/90024(DRP))

Matters Discussed: The following examples of apparent violations were discussed: (1) an inadequate procedure (TP 6303) for given hot standby conditions during EHC system restoration; (2) inadequate corrective actions for identified procedure deficiency (TP 6303) identified during first shift on October 27, 1990; (3) examples of failures to perform activities in accordance with administrative and operating procedures.

1. Enforcement Conference Attendees

Commonwealth Edison Company

D. Galle, Vice President, BWR Operations  
R. Immke, Nuclear Station Operator  
S. Seaborn, Shift Engineer  
G. Masters, Assistant Superintendent of Operations, Braidwood  
D. Miller, Regulatory Assurance, Braidwood  
B. Strub, Technical Staff System Engineer Supervisor  
S. Gordon, Nuclear Station Operator  
R. Bax, Station Manager, Quad Cities  
D. Edwards, Chief Steward, Quad Cities  
J. Swales, Assistant Superintendent of Operations, Quad Cities  
B. Palagi, Chief Nuclear Engineer  
M. Turbak, Onsite Safety Superintendent  
C. Sargent, Nuclear Operations  
G. Tietz, Superintendent of Station Programs, Quad Cities  
P. Planing, Shift Engineer, Dresden  
R. Stols, Nuclear Licensing Administrator  
H. Hentschel, Operating, LaSalle  
R. Radtke, Compliance Engineer  
D. Gibson, Regulatory Assurance Supervisor, Quad Cities  
R. Querio, General Manager - Quality Programs

Winston and Strawn

N. Reynolds, legal counsel for Commonwealth Edison Company  
T. Poindexter, legal counsel for Commonwealth Edison Company

U.S. Nuclear Regulatory Commission

C. Paperiello, Deputy Regional Administrator  
R. Barrett, Project Director Commonwealth Edison Plants, NRR  
H. Miller, Director, Division of Reactor Projects  
J. Lieberman, Director, Office of Enforcement  
C. Pederson, Director, Enforcement  
W. Shafer, Chief, Branch 1, Division of Reactor Projects  
J. Shine, Resident Inspector, Quad Cities  
T. Taylor, Senior Resident Inspector, Quad Cities  
R. Bocanegra, Resident Inspector, Quad Cities  
B. Burgess, Chief, Projects Section 1B  
T. Burdick, Chief, Operations Branch, DRS  
J. Lennartz, Operator Licensing Examiner  
H. Peterson, Operator Licensing Examiner  
C. Weil, Enforcement Specialist  
M. Farber, Chief, Reactor Projects Section 1A  
L. Miller, Acting Chief Region Performance & Oversight, NRR  
M. Jordan, Chief, Operator Licensing Section 1  
G. Wright, Deputy Director, Division of Reactor Safety  
B. Berson, Regional Counsel  
J. Luehman, Senior Enforcement Specialist, Office of Enforcement  
R. Leemon, Resident Inspector, Zion

J. Smith, Senior Resident Inspector, Zion  
A. Bongiovanni, Resident Inspector, Zion  
L. Olshan, Quad Cities Project Manager, NRR

## 2. Enforcement Conference

As a result of the apparent violations of NRC requirements discovered during the NRC inspector's review of the October 27, 1990, Quad Cities Unit 2 Reactor Scram, an Enforcement Conference was held at the Region III Office in Glen Ellyn, Illinois, on December 7, 1990. The preliminary findings which were the basis for these apparent violations of NRC requirements were documented in NRC Inspection Report 50-265/90020(DRP) and was transmitted to the licensee by letter, dated November 30, 1990. The attendees of this enforcement conference are denoted in Paragraph 1 of this report.

The purposes of the conference were: (1) to discuss the apparent violations, the significance, cause, and the licensee's corrective actions; (2) to determine whether there were any mitigating circumstances; and (3) to obtain other information which would help determine the appropriate enforcement action.

The NRC representatives described the apparent violations and those deficiencies contributing to the apparent violations. The licensee presented information which is included as Enclosure 1 to this report.

The licensee provided clarifying information for the following issues during their Enforcement Conference presentation regarding; inadequate procedure (TP 6303), inadequate corrective actions for an identified procedure deficiency (TP 6303), failure of the Operating Engineer to contact Nuclear Engineering, and failure to log a hot notch condition.

Further information regarding these issues is contained on pages 47, 48, and 49 of the attached licensee presentation.

During the Enforcement Conference NRC personnel requested information concerning the number of entries within the past two years into a Hot Standby Condition (HSB) with bypass valves closed. During the conference, the licensee stated that the HSB condition had been entered six times.

Review of the information submitted identified that for the six HSB operations, three apparently did not involve operation with bypass valves closed. HSB operation with bypass valves closed at 800 psig was the operating condition prior to the Unit 2 scram. Review of the data does not adequately document any sustained operating condition of 800 psig with the bypass valves closed. The licensee's assumption that these six HSB operations demonstrated competent operation similar to the plant conditions encountered just prior to the Unit 2 scram was not supported by the information provided. It appears that the licensee's evaluation of the six previous entries into HSB condition was inaccurate, however, NRC review of this data did not identify any additional safety concerns.

Information concerning the licensee's short term and long-term corrective and remedial actions are contained in the attached licensee presentation.

### 3. Conclusion

The evaluation and disposition of the remaining apparent violations documented in 265/90020 will be presented in subsequent communications.



DECEMBER 7, 1990

QUAD CITIES UNIT 2  
REACTOR SCRAM  
ENFORCEMENT CONFERENCE

AGENDA

- INTRODUCTION D. GALLE
  
- BACKGROUND AND  
SEQUENCE OF EVENTS R. BAX  
B. STRUB  
J. KOPACZ  
H. HUISINGH  
R. RUSTICK  
S. GORDON
  
- CONCLUSIONS AND  
CORRECTIVE ACTIONS R. BAX
  
- REVIEW OF INSPECTION  
REPORT CONCLUSIONS T. KOVACH
  
- CLOSING REMARKS D. GALLE

## INTRODUCTION

- WE VIEW THIS EVENT SERIOUSLY AND RECOGNIZE THE NEED FOR APPLYING LESSONS LEARNED.
  - INITIAL INVESTIGATION
  - CORPORATE INVESTIGATION
  - LASALLE OPERATING ENGINEER ASSESSMENT
  - PREPARATIONS FOR THIS CONFERENCE
- THE ISSUES IDENTIFIED IN THE UNIT 2 REACTOR SCRAM HAVE BEEN EXTENSIVELY EVALUATED BY CECO AND THE PERSONNEL INVOLVED DURING THE PREPARATIONS FOR THIS CONFERENCE.
  - SOME INDIVIDUAL PERFORMANCE WEAKNESSES WERE IDENTIFIED WITH RESPECT TO HOT STANDBY OPERATIONS. THE CHECKS AND BALANCES PROVIDED BY THE MANAGEMENT SYSTEM WERE NOT EFFECTIVE DURING THIS OPERATION.
  - SOME COMPANY EXPECTATIONS WERE TOO NARROWLY FOCUSED, AND IN LIGHT OF THIS EVENT MUST BE UPGRADED
- THE SAFETY SIGNIFICANCE OF THIS EVENT IS MINIMAL

## BACKGROUND

### TURBINE TORSIONAL TEST

- THE PURPOSE OF THE TURBINE-GENERATOR TORSIONAL RESPONSE TEST IS TO:
  - MEASURE ANY TORSIONAL RESONANT FREQUENCIES OF THE LOW PRESSURE TURBINE ROTORS FROM 53 HZ (800 RPM) TO 127 HZ (1900 RPM)
  - VERIFY THAT THERE ARE NO TORSIONAL RESONANT FREQUENCIES NEAR NORMAL OPERATING SPEED (1800 RPM) WHICH COULD BE EXCITED BY SOME LINE DISTURBANCE FROM THE SWITCHYARD
- RESONANT FREQUENCY COULD DAMAGE LOW PRESSURE TURBINE BLADING, ESPECIALLY LAST STAGE BUCKETS

## BACKGROUND (CONTINUED)

- EXTENSIVE PREPARATIONS WERE MADE FOR THE TEST
  - FOUR ON-SITE REVIEW MEETINGS HELD
  - TRANSDUCERS INSTALLED ON TURBINE ROTOR IN MAY, 1990
  - GENERAL ELECTRIC (GE) AND BROWN-BOVERI (BBC) CONTRACTED TO PROVIDE TECHNICAL SUPPORT.
    - GE TO PROVIDE TURBINE CONTROL DURING TEST
    - BBC TO PREDICT TURBINE ROTOR RESPONSE
  - SPECIAL TEST PROCEDURE WAS BASED UPON THE BYRON TEST PROCEDURE (WHICH WAS PERFORMED SUCCESSFULLY) WITH FURTHER IMPROVEMENTS IMPLEMENTED.
  - THE TEST WAS DELAYED FROM MAY TO SEPTEMBER TO ENSURE THAT PROPER PREPARATIONS ARE COMPLETED.

## BACKGROUND (CONTINUED)

- QUAD CITIES STATION ATTEMPTED TO PERFORM TURBINE TORSIONAL TEST ON 9/28/90
  - TEST WAS TERMINATED DUE TO TURBINE CONTROL PROBLEMS.
- LESSONS LEARNED FROM 9/28/90 TEST WERE IDENTIFIED AND INCORPORATED INTO PROCEDURES.
  - TWO CHANGES TO THE PROCEDURE TO CORRECT TECHNICAL DISCREPANCIES (A JUMPER INSTALLATION AND THE USE OF A SPARE CABLE)
  - AN ADMINISTRATIVE IMPROVEMENT FOR AN OUT-OF-SERVICE
  - IMPROVED THE PROCEDURE TO CLARIFY WHEN THE TEST DIRECTOR SHOULD ORDER A MANUAL SCRAM
  - IMPROVED THE STEPS TO PERFORM SYSTEM RESTORATION IN THE EVENT THAT THE TEST IS TERMINATED PRIOR TO COMPLETION

SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER



## SEQUENCE OF EVENTS

10/27/90

### SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER

- I WAS THE TEST DIRECTOR IN CHARGE OF THIS SAME EVOLUTION WHEN IT WAS ATTEMPTED ON 9/28/90
- (0000) DRYWELL DE-INERTED AND IRM 16 WAS INSERTED IN THE CORE

### NEUTRON MONITORING SYSTEM

- SOURCE RANGE MONITORS (SRM)
  - PROVIDE NEUTRON MONITORING AT LOW POWER
  - RETRACTED FROM CORE TO AVOID BURN-UP

## SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

### NEUTRON MONITORING SYSTEM (CONTINUED)

- INTERMEDIATE RANGE MONITORS (IRM)
  - MONITORS FROM .004% TO 40% POWER
  - OVERLAP WITH SRMs AND AVERAGE POWER RANGE MONITORS (APRMs)
  - 2 AMPLIFIERS
    - 1 FOR RANGE 1 TO 6
    - 1 FOR ABOVE RANGE 7
  - RETRACTED FROM CORE TO AVOID BURN-UP
- AVERAGE POWER RANGE MONITORS (APRM)
  - USED DURING POWER OPERATION (TYPICALLY GREATER THAN 5% POWER)
  - AVERAGES INPUTS FROM LOCAL POWER RANGE MONITORS
  - OVERLAPS WITH IRMs
- PRIOR TO STARTING THE TEST ON 10/27/90, THE UNIT 2 NSO, THE "EXTRA" NSO, SCRE, SE AND I DISCUSSED IN DETAIL THE TORSIONAL TEST AND HOT STANDBY OPERATION
  - TEMPORARY PROCEDURE 6303 IN PROGRESS TO TAKE REACTOR TO HOT STANDBY

## SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

### HOT STANDBY OPERATION

- HOT STANDBY IS A CONDITION WHERE REACTOR PRESSURE IS MAINTAINED NEAR RATED CONDITIONS. THE ACTUAL LEVEL AT WHICH PRESSURE IS MAINTAINED IS NOT IMPORTANT DUE TO MODERATOR HEAT-UP BEING NEARLY COMPLETE AT 700 PSIG.
- REACTOR POWER IS MAINTAINED AT LESS THAN 1%.
  - GENERATOR IS OFF-LINE AND TURBINE BYPASS VALVES ARE CLOSED (NO LOAD ON REACTOR).
  - IF PERFORMED WITH MSIV'S OPEN AND CONDENSER VACUUM MAINTAINED, THEN A SMALL AMOUNT OF REACTOR LOAD IS ALLOWED IN ORDER TO KEEP STEAM JET AIR EJECTORS IN OPERATION. REACTOR POWER IS MAINTAINED ON RANGE 6 OR 7 ON THE IRMs.
  - IF PERFORMED WITH THE MSIVs CLOSED, THEN REACTOR POWER MUST BE EXTREMELY LOW. IN FACT, EVEN WITH POWER ON ANY RANGE LOWER THAN RANGE 6 ON THE INTERMEDIATE RANGE MONITORS (IRMs), REACTOR PRESSURE MAY CONTINUE TO RISE, IF DECAY HEAT IS LARGE.

SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

- (0240) REACTOR MODE SWITCH POSITIONED TO STARTUP/HOT STANDBY. POWER REDUCTION CONTINUES PER TP 6303.
- THE UNIT 2 NSO WAS SHUTTING DOWN TO A SUBCRITICAL HOT STANDBY CONDITION. HE REACHED THE FOLLOWING STEP IN THE PROCEDURE WHICH WAS UNCLEAR TO Him.
  - STEP 38.b "INSERT CONTROL RODS UNTIL REACTOR PRESSURE EQUALS 920 PSIG AND THE REACTOR IS SUBCRITICAL BY AT LEAST THREE RODS."
- THE NSO AND SCRE QUESTIONED THE MEANING OF THIS STEP AND ASKED ME TO EXPLAIN WHAT IT MEANS TO BE SUBCRITICAL BY AT LEAST THREE RODS.
- I SAID IT MEANT BEING SUBCRITICAL BY THE NOTCHES ON THE NEXT THREE CONTROL RODS IN THE ROD SEQUENCE PATTERN.
- THE NSO AND SCRE ACCEPTED MY EXPLANATION BUT DID NOT FEEL TECHNICALLY QUALIFIED TO SIGN THE STEP. SINCE I HAD THE CHECKLIST IN MY HANDS, I INITIALED IT OFF. THIS IS ACCEPTABLE PER OUR PROCEDURES.

SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

- AFTER FURTHER DISCUSSION WITH THE NSO, I ADDED A NOTE ON THE CHECKLIST AT STEP 38.b TO EXPLAIN THAT SUBCRITICALITY HAD BEEN REACHED.

"IMPOSSIBLE TO TELL EXACT NUMBER OF RODS SUB CRIT. TOOK PRESS TO 825 PSIG"

- IN THE NOTE, I ATTEMPTED TO COMMUNICATE THAT WHILE IT IS DIFFICULT TO DETERMINE THE EXACT NUMBER OF CONTROL RODS THAT THE REACTOR IS SUBCRITICAL BY, THE FACT THAT PRESSURE WAS AT 825 PSIG DEMONSTRATED THAT IT WAS SUBCRITICAL BY GREATER THAN 3 CONTROL RODS WHEN THE REACTOR PRESSURE WAS AT 920 PSIG AS SPECIFIED IN THE PROCEDURE.
- THE NSO AND SCRE CONTINUED WITH THE PROCEDURE.
- (0340) RECEIVED 1/2 SCRAM WHEN IRM 14 RANGING FROM RANGE 7 TO RANGE 6 DUE TO AN AMPLIFIER OVERLAP PROBLEM.
- WHILE CONTROLLING REACTOR POWER/PRESSURE TO ALLOW ELECTRO-HYDRAULIC CONTROL (EHC) PUMPS TO BE TAKEN OFF, CONTROL ROD G-7 WAS WITHDRAWN FROM POSITION 08 to 10.
- THE IRMs RESPONDED AND REQUIRED RANGING FROM ABOUT RANGE 5 TO RANGE 7 OVER A TIME PERIOD OF A COUPLE OF MINUTES.



SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

- THIS NOTCH WORTH WAS GREATER THAN AVERAGE; HOWEVER, IT WAS NOT UNEXPECTED.
  - ROD G-7 WAS NEAR THE CORE CENTER
  - NOTCHES 08 TO 12 ARE ALWAYS THE HIGHEST WORTH
  - XENON CONDITIONS WERE RAPIDLY CHANGING
  
- BECAUSE THIS WAS NOT AN ABNORMAL CONDITION, IT WAS NOT LOGGED BY THE CREW. THIS EVENT WAS DISCUSSED WITH THE SHIFT RELIEFS SINCE THE NEXT SHIFT WOULD BE NOTCHING OUT RODS FROM THIS SAME ROD PATTERN, IN THESE CONDITIONS.
  
- (0420) UNIT 2 EHC PUMPS OFF; REACTOR PRESSURE STEADY AT 830 PSIG; PROCEDURE TP 6303 (QGP 2-4) "UNIT SHUTDOWN TO HOT STANDBY" COMPLETED.
  
- REACTOR PRESSURE IS BEING MAINTAINED BY PROCEDURE QGP 4-1 "CONTROL ROD MOVEMENTS AND CONTROL ROD SEQUENCES".
  
- INFORMED THE TECH STAFF ENGINEER THAT THE EHC SYSTEM WAS OFF AND THAT THE IMs COULD BEGIN THE EHC CHANGES TO ALLOW THE TEST TO BE PERFORMED.



## SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

- (0700) SHIFT 2 ASSUMES CONTROL.
  - TURBINE TORSIONAL TEST IN PROGRESS
  - UNIT 2 IN HOT STANDBY WITH REACTOR PRESSURE AT APPROXIMATELY 860 PSIG
  - TURBINE BYPASS VALVES CLOSED
  - DRYWELL DE-INERTED
  
- (0900) NUCLEAR ENGINEER ON SITE TO OVERSEE CALIBRATION OF AVERAGE POWER RANGE MONITORS (APRMs)
  
- (1010) CONTROL RODS WITHDRAWN TO OPEN 1 TO 2 BYPASS VALVES TO PREPARE THE TURBINE FOR THE TEST.
  
- (1226) BEGAN TO ROLL THE TURBINE
  
- (1323) DIFFICULTIES ENCOUNTERED WITH TURBINE ACCELERATION. TEST STATUS IS UNDER EVALUATION.
  
- (1400 to 1500) SHIFT TURNOVERS IN PROGRESS (SHIFT 2 TO SHIFT 3)
  
- (1430) CONFERENCE CALL IN CONTROL ROOM TO DISCUSS STATUS OF TURBINE TORSIONAL TEST.

SHIFT 1 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

- (1500) SHIFT 3 ASSUMES CONTROL
  - TURBINE TORSIONAL TEST ON HOLD BEING EVALUATED
  - REACTOR PRESSURE AT APPROXIMATELY 920 PSIG
  - MODE SWITCH IN STARTUP/HOT STANDBY
  - 1½ TURBINE BYPASS VALVES OPEN
  - DRYWELL DE-INERTED
  - IRMs ON RANGE 9 (POWER AT 7%)

SHIFT 3 TEST DIRECTOR/OPERATING ENGINEER

### SHIFT 3 TEST DIRECTOR/OPERATING ENGINEER (CONTINUED)

- I ARRIVED AT THE STATION AT APPROXIMATELY 1500. I MET THE SHIFT 2 TEST DIRECTOR IN THE OPERATING ENGINEER'S OFFICE. THE SHIFT 2 TEST DIRECTOR INDICATED THAT THERE WOULD BE A CONFERENCE CALL WITH THE PRODUCTION SUPERINTENDENT IN THE SHIFT ENGINEER'S OFFICE TO CONTINUE A PREVIOUS DISCUSSION ON THE TURBINE TEST.
- WE PROCEEDED TO THE SHIFT ENGINEER'S OFFICE. PRESENT TEST STATUS WAS CONVEYED BUT NO TURNOVER WAS YET CONDUCTED
- A CONFERENCE CALL WAS HELD IN THE SHIFT ENGINEER'S OFFICE BETWEEN THE SHIFT 2 AND 3 TEST DIRECTORS, THE SHIFT 3 SHIFT ENGINEER AND THE PRODUCTION SUPERINTENDENT TO DISCUSS THE TORSIONA! TEST AND DRYWELL INERTING.
- IT WAS DECIDED TO TERMINATE THE SPECIAL TORSIONAL TEST, TAKE THE UNIT TO HOT STANDBY TO REMOVE TEST EQUIPMENT FROM EHC AND BEGIN INERTING THE DRYWELL.
- I DISCUSSED WITH THE SHIFT ENGINEER THE RETURN OF THE EHC LOGIC TO NORMAL, BRINGING THE UNIT TO HOT STANDBY AND RE-INERTING THE DRYWELL.
- PRIOR TO TAKING STEPS TO IMPLEMENT THE TEST TERMINATION, A SECOND CONFERENCE CALL WAS HELD WITH THE PRODUCTION SUPERINTENDENT TO REASSESS WHETHER THE SPECIAL TEST COULD BE CONTINUED.



### SHIFT 3 TEST DIRECTOR/OPERATING ENGINEER

- THE PRODUCTION SUPERINTENDENT, THE SHIFT 3 SHIFT ENGINEER AND THE SHIFT 2 AND 3 TEST DIRECTORS DETERMINED THAT THE TEST SHOULD BE TERMINATED.
- ONCE THE TEST WAS TERMINATED, I BELIEVED MY ROLE AS TEST DIRECTOR WAS COMPLETED. THE SHIFT ENGINEER WAS IN TOTAL CONTROL OF THE PLANT (PER STEP 13.4 IN SPECIAL TEST 2-95).
- AT THIS POINT, THE TEST PROCEEDED TO "SYSTEM RESTORATION" PHASE. THE TECH STAFF ENGINEER SUPERVISED THE RETURN OF EHC TO NORMAL CONFIGURATION.
- I WENT TO THE TECH STAFF SUPERVISOR'S OFFICE WITH THE SHIFT 2 TEST DIRECTOR TO DISCUSS A UNIT 1 OUTAGE CONCERN. WE LEARNED ABOUT THE SCRAM THROUGH THE PLANT ANNOUNCEMENT SYSTEM AND PROCEEDED TO THE CONTROL ROOM.

SHIFT 3 SHIFT ENGINEER (SE)



### SHIFT 3 SHIFT ENGINEER (SE)

- PRIOR TO THE START OF SHIFT 3, I WAS AWARE OF THE DISCUSSION (BETWEEN SHIFT 2 TEST DIRECTOR, SHIFT 2 SE AND PRODUCTION SUPERINTENDENT) IN THE CONTROL ROOM REGARDING THE STATUS OF THE TORSIONAL TEST.
- BEFORE LEAVING THE CONTROL ROOM, I REVIEWED THE STATUS OF THE UNIT 1 AND 2 PANELS. I ALSO REVIEWED THE LOGS AS PART OF SHIFT TURNOVER.
- I BEGAN TURNOVER WITH SHIFT 2 SE DISCUSSING THE STATUS OF THE TURBINE TORSIONAL TEST AND THE CONDITION OF THE IRMs.
- I LEFT THE CONTROL ROOM WITH THE SHIFT 2 SE AND WENT TO THE SE'S OFFICE WHERE WE BEGAN REVIEW OF THE SE'S LOG BOOKS.
- AS TURNOVER CONTINUED, I BECAME INVOLVED IN THE CONFERENCE CALL TAKING PLACE IN THE SE'S OFFICE REGARDING THE TURBINE TORSIONAL TEST, DRYWELL RE-INERTING AND THE CONDITION OF THE IRMs.
- THE DECISION WAS MADE BY THE PRODUCTION SUPERINTENDENT TO TERMINATE THE TORSIONAL TEST AND REDUCE REACTOR PRESSURE TO RESTORE THE EHC LOGIC TO NORMAL.

### SHIFT 3 SHIFT ENGINEER (CONTINUED)

- PRIOR TO INFORMING THE CONTROL ROOM OF TEST TERMINATION, A SECOND DISCUSSION WAS HELD WITH THE PRODUCTION SUPERINTENDENT TO RE-EVALUATE WHETHER THIS TORSIONAL TEST COULD BE CONTINUED. IT WAS DECIDED TO TERMINATE THE TEST.
- I INFORMED THE SCRE THAT THE TURBINE TORSIONAL TEST WAS TERMINATED AND TO INSERT CONTROL RODS TO REDUCE REACTOR PRESSURE TO APPROXIMATELY 800 PSIG. I WAS ALSO SENDING THE DOCUMENTATION FOR CLEARING THE OUT-OF-SERVICE TO ALLOW DRYWELL INERTING AND THAT IRM 16 WOULD BE LEFT IN THE CORE. I ALSO INFORMED THE SCRE THAT WHEN ALL THE BYPASS VALVES WERE CLOSED AND THE EHC SYSTEM WAS NO LONGER REQUIRED, TO PROCEED WITH SECURING THE EHC PUMPS SO THAT TEST INSTRUMENTS COULD BE REMOVED FROM THE EHC LOGIC.
- I HELD MY NORMAL BRIEFING WITH THE FOREMEN AND OTHER STATION DEPARTMENTS. THE CONTROL ROOM BRIEFING, WHICH IS NORMALLY HELD AT THE BEGINNING OF THE SHIFT, WAS DELAYED BECAUSE OF THE DISCUSSIONS THAT INVOLVED RETURNING UNIT 2 TO NORMAL STATUS.
- I THEN ENTERED THE CONTROL ROOM TO PERFORM THE SHIFT BRIEFING WHEN THE UNIT 2 SCRAM OCCURRED.

SHIFT 3 SHIFT CONTROL ROOM ENGINEER (SCRE)

AND

SHIFT 3 NUCLEAR STATION OPERATOR (NSO)

### SHIFT 3 SCRE AND NSO

- (SCRE) I BEGAN MY SHIFT TURNOVER AT APPROXIMATELY 1400. I DISCUSSED THE STATUS OF THE TURBINE TORQUE ONAL TEST WITH THE SHIFT 2 SCRE.
  - THE SHIFT 2 SCRE DISCUSSED THE ITEMS ON THE TURNOVER SHEET AND WE PROCEEDED TO THE SHIFT 1 PANEL FOR OUR WALKDOWN.
  - AFTER WALKING DOWN THE UNIT PANELS, I READ THE LOG BOOKS (SCRE, U-1, U-2 AND CENTER DESK).
  - I ASSUMED THE SHIFT AT APPROXIMATELY 1430.
- (SCRE) A CONFERENCE CALL WAS ONGOING IN THE CONTROL ROOM TO DETERMINE THE DIRECTION OF TURBINE TEST AND DRYWELL INERTING.
  - THE CALL WAS COMPLETED AND I REQUESTED THAT SUPPORT PERSONNEL LEAVE THE CONTROL ROOM TO ALLOW FOR THE CONTROL ROOM QUIET TIME.



### SHIFT 3 SCRE AND NSO (CONTINUED)

- (NSO) 1440 SHIFT TURNOVER BEGAN AT 1440
  - DISCUSSED TURBINE TORSIONAL TEST STATUS
  - DISCUSSED IRM OPERATING PROBLEMS INCLUDING THE NEED TO DOWN RANGE WHEN DOWN-SCALE TO PREVENT HALF SCRAMS
  - EHC ACTIVITIES THAT MAY OCCUR
  - TIME RESTRAINTS REGARDING DRYWELL INERTING AND OBTAINING DRYWELL TO TORUS DIFFERENTIAL PRESSURE
  - ROUTINE PANEL WALKDOWNS AND OTHER TURNOVER ITEMS
  
- (SCRE) THE NUCLEAR ENGINEER PROVIDED ME INSTRUCTIONS TO ENSURE THAT REACTOR POWER BE MAINTAINED AT LESS THAN 2 BYPASS VALVES (BPV). I PROVIDED THE INFORMATION TO THE NSO. HE INFORMED ME THAT 1 3/4 BPVs' WERE OPEN BY POSITION INDICATION. I DIRECTED THE NSO TO INSERT CONTROL RODS TO 1 1/2 BPVS OPEN.
  
- (NSO) THE SCRE AND I DISCUSSED AT LENGTH THE BPV POSITION AND WHEN THE INSERTION OF CONTROL RODS SHOULD BEGIN

### SHIFT 3 SCRE AND NSO (CONTINUED)

- (NSO) I REPEATED-BACK THE SCRE'S DIRECTION AND INSERTED CONTROL RODS TO DECREASE POWER TO OBTAIN 1.5 BPVs OPEN. I INFORMED THE SCRE OF THE BPV STATUS AND THAT ROD INSERTION WAS COMPLETE. THROUGHOUT THIS EVOLUTION (AND SUBSEQUENT EVOLUTIONS), REPEAT-BACKS WERE USED.
- (SCRE) THE SHIFT ENGINEER CONTACTED ME WITH SOME INFORMATION/DIRECTION:
  - TURBINE TORSIONAL TEST WAS TERMINATED
  - INSERT CONTROL RODS AND REDUCE REACTOR PRESSURE TO 800 PSIG
  - WHEN AT 800 PSIG, SECURE EHC PUMPS SO THAT TEST INSTRUMENTS COULD BE REMOVED FROM EHC LOGIC
  - OUT-OF-SERVICE FOR INERTING
  - IRM 16 WOULD REMAIN IN CORE
- (SCRE) I DIRECTED THE UNIT 2 NSO TO INSERT CONTROL RODS TO REDUCE REACTOR PRESSURE TO 800 PSIG IN ORDER TO SECURE EHC PUMPS BECAUSE THE TURBINE TEST WAS TERMINATED.
- (SCRE) I DIRECTED THE EXTRA NSO TO REVIEW THE PROCEDURE FOR SECURING EHC PUMPS.
- (SCRE) I DIRECTED THE CENTER DESK NSO TO CONTACT THE NECESSARY PERSONNEL FOR DRYWELL INERTING.



### SHIFT 3 SCRE AND NSO (CONTINUED)

- (NSO) I INSERTED CONTROL RODS TO REDUCE REACTOR PRESSURE TO 800 PSIG, IN ACCORDANCE WITH ROD SEQUENCE PROCEDURES.
- (NSO) IRMs WERE RANGED DOWN WHEN THE IRM DOWNSCALE WAS REACHED (TO AVOID SPURIOUS HALF-SCRAMS FROM SPIKING HIGH-HIGH).
- (NSO) THE BPVs CLOSED AT ABOUT 920 PSIG AND REACTOR PRESSURE STARTED TO SLOWLY DECREASE. I CONTINUED TO INSERT CONTROL RODS TO ACHIEVE 800 PSIG.
- (SCRE) LOAD DISPATCHER CALLED ME TO DISCUSS THE STATUS OF THE MAIN DISCONNECT GROUND (WHICH WAS PART OF THE TURBINE TEST).
  - I REQUESTED THAT THE SHIFT FOREMAN CONTACT THE APPROPRIATE PERSONNEL TO REMOVE THE MAIN DISCONNECT GROUND.
- (SCRE) I REQUESTED THAT THE TECH STAFF ENGINEER INVOLVED WITH THE TEST COME TO THE CONTROL ROOM. I REVIEWED THE TURBINE TEST PROCEDURE WITH THE INSTRUMENT MECHANIC (IM) AND THE TECH STAFF ENGINEER TO ENSURE APPROPRIATE ACTIONS WERE UNDERWAY TO EXIT THE TEST PROCEDURE.

### SHIFT 3 SCRE AND NSO (CONTINUED)

- (SCRE) I INFORMED THE NUCLEAR ENGINEER THAT THE TORSIONAL TEST WAS TERMINATED AND REACTOR POWER WOULD BE DECREASED TO SECURE THE EHC PUMPS.
- (SCRE) THE NUCLEAR ENGINEER REQUESTED THAT HE BE CONTACTED IF THE APRMs NEEDED CALIBRATION OR AT 40% POWER.
- (SCRE) COMMUNICATION CENTER PERSONNEL ENTERED THE CONTROL ROOM AND PROVIDED ME THE OUT-OF-SERVICE SHEET FOR INERTING. I VERIFIED THE ACCURACY OF THE OUT-OF-SERVICE.
- (SCRE) WHEN REACTOR PRESSURE WAS APPROXIMATELY 800 PSIG, THE EXTRA NSO WAS DIRECTED TO SECURE EHC PUMPS.
  - THE IMs AND SHIFT ENGINEER WERE INFORMED THAT THE EHC PUMPS WERE SECURED.
- (SCRE) THE NSO AND I OBSERVED THAT REACTOR PRESSURE WAS AT 780 PSIG AND DECREASING. I DIRECTED THE NSO TO WITHDRAW CONTROL RODS. I CHECKED THE ROD WORTH MINIMIZER TO VERIFY THAT THERE WERE NO ERRORS IN SEQUENCE.

### SHIFT 3 SCRE AND NSO (CONTINUED)

- (NSO) SOURCE RANGE MONITORS (SRM) WERE INSERTED TO CLEAR THE ROD BLOCK. I ALSO GLANCED AT THE SRM INDICATOR TO ENSURE THAT THEY HAD FULLY INSERTED AND WERE INDICATING PROPERLY. NEXT, 4 CONTROL RODS WERE WITHDRAWN ONE NOTCH IN ORDER TO BRING REACTOR PRESSURE BACK TO 800 PSIG.
  - DURING THE ROD WITHDRAWAL, MY ATTENTION WAS FOCUSED ON REACTOR PRESSURE.
  - I HAD A SHORT DISCUSSION WITH THE SCRE ABOUT THE IRMS; THEN I WITHDREW THE NEXT ROD ONE NOTCH AND NOTED NO CHANGE IN REACTOR PRESSURE.
  - I SELECTED THE NEXT CONTROL ROD AND THE UNIT SCRAMMED.
- (SCRE) I TOLD THE NSO TO PLACE THE MODE SWITCH TO SHUTDOWN AND IMPLEMENT THE SCRAM PROCEDURE. THE SE ENTERED THE CONTROL ROOM AND WAS INFORMED OF THE SCRAM.

## CAUSE OF REACTOR SCRAM

### CONTRIBUTING CAUSES

- LACK OF DETAILED MANAGEMENT DIRECTION FROM OE/SE TO SCRE REGARDING THE TERMINATION OF THE TEST
- LACK OF DETAILED MANAGEMENT DIRECTION FROM SCRE TO NSO REGARDING HOT STANDBY OPERATION AND LIMITED COMMUNICATION BETWEEN SCRE AND NSO
- TRAINING WEAKNESS REGARDING OPERATION IN HOT STANDBY CONDITIONS

### PRIMARY CAUSE

- ERROR BY THE NSO. HE WAS FOCUSED ON REACTOR PRESSURE AND WAS UNAWARE THAT THE REACTOR WAS SUBCRITICAL.



## REACTOR PERFORMANCE/SAFETY SIGNIFICANCE

- THE PURPOSE OF THE IRMs IS TO MONITOR NEUTRON FLUX AND TO INITIATE A REACTOR SCRAM IN THE EVENT OF HIGH NEUTRON FLUX. DURING THIS EVENT, THE IRMs PERFORMED AS EXPECTED.
- AN ANALYSIS WAS PERFORMED BY THE NUCLEAR FUEL SERVICES DEPARTMENT ON THE REACTIVITY WORTH OF THE CONTROL RODS THAT RESULTED IN THE POWER INCREASE.
  - THE WORTH OF THE CONTROL RODS WAS:
    - NOT GREATER THAN EXPECTED
    - SUFFICIENT TO PRODUCE THE RESULTING POWER INCREASE
  - THE SHORT PERIOD, WHICH CAUSED THE IRM HIGH-HIGH FLUX AND THE UNIT SCRAM, IS CONSISTENT WITH THE ANALYTICAL RESULTS.
  - THE EVENT IS CLEARLY BOUNDED BY THE FSAR LIMITING REACTIVITY EVENTS AT LOW POWER.



REACTOR PERFORMANCE/SAFETY SIGNIFICANCE  
(CONTINUED)

- THE ONSITE NUCLEAR ENGINEERING GROUP VERIFIED THAT CORE REACTIVITY WAS WITHIN THE TECHNICAL SPECIFICATION LIMITS BY EVALUATION OF THE CRITICAL ROD PATTERN DURING THE SUBSEQUENT CRITICALITY.
- THE ANALYSES AND VERIFICATION DEMONSTRATE THE CORE IS OPERATING PER DESIGN.
- BASED ON THIS INFORMATION, THIS EVENT HAD MINIMAL SAFETY SIGNIFICANCE FROM A TECHNICAL STANDPOINT.
- THIS EVENT, HOWEVER, DOES REPRESENT A SIGNIFICANT DEPARTURE FROM MANAGEMENT EXPECTATIONS REGARDING PERFORMANCE

## CREW PERFORMANCE

### CONCLUSIONS

- IT IS COMMONWEALTH EDISON'S EXPECTATION THAT OPERATIONS MANAGEMENT PROVIDE ADEQUATE DIRECTION TO OPERATORS.
  - OE/SE DID NOT PROVIDE ADEQUATE DIRECTION TO CONTROL ROOM PERSONNEL (SCRE/NSO).
  - SCRE DID NOT PROVIDE DETAILED INSTRUCTIONS TO THE NSO.
- IT IS COMMONWEALTH EDISON'S EXPECTATION THAT COMMUNICATIONS TO OPERATING PERSONNEL BE CLEAR AND CONCISE.
  - COMMUNICATION BETWEEN THE SCRE AND NSO WAS INADEQUATE. FURTHERMORE, THE NSO DID NOT REQUEST ADDITIONAL INSTRUCTION/DIRECTION FROM THE SCRE, WHEN APPROPRIATE.

## CREW PERFORMANCE (CONTINUED)

### CONCLUSIONS (CONTINUED)

- IT IS COMMONWEALTH EDISON'S EXPECTATION THAT OPERATORS BE COGNIZANT OF ESSENTIAL PLANT PARAMETERS (POWER, PRESSURE, LEVEL) AT ALL TIMES.
  - THE NSO DID NOT ADEQUATELY MONITOR REACTOR POWER DURING CONTROL ROD INSERTION.
  - THE NSO DID NOT ADEQUATELY MONITOR SOURCE RANGE MONITORS DURING CONTROL ROD WITHDRAWAL.
- IT IS COMMONWEALTH EDISON'S EXPECTATION THAT ABNORMAL CONDITIONS ENCOUNTERED BE LOGGED AND COMMUNICATED TO SUBSEQUENT SHIFTS.
  - OUR GUIDANCE WAS NOT SUFFICIENTLY COMPREHENSIVE. CONDITIONS ENCOUNTERED DURING THE SHIFT, THAT IN THE JUDGEMENT OF THE OPERATOR DID NOT MEET THE THRESHOLD OF "ABNORMAL", WERE OFTEN VERBALLY COMMUNICATED TO THE NEXT SHIFT BUT NOT LOGGED. THE ROD WORTH ENCOUNTERED ON SHIFT 1 IS AN EXAMPLE. GIVEN THIS, THERE WAS NO ASSURANCE THAT THIS INFORMATION WOULD HAVE BEEN PASSED ON TO SUBSEQUENT SHIFTS.

## CREW PERFORMANCE (CONTINUED)

### CONCLUSIONS (CONTINUED)

- IT IS COMMONWEALTH EDISON'S EXPECTATION THAT THE NUCLEAR ENGINEERING GROUP WILL BE NOTIFIED OF PLANNED REACTIVITY CHANGES, SUCH AS STARTUP, SHUTDOWN AND MAJOR POWER CHANGES.
- THIS GUIDANCE WAS NOT SUFFICIENT IN THAT, WHILE THE NUCLEAR ENGINEERING GROUP WAS NOTIFIED OF REACTIVITY CHANGES, NUCLEAR ENGINEER SUPPORT WAS NOT REQUIRED FOR SOME CONDITIONS, SUCH AS OPERATING IN A HOT STANDBY CONDITION.

### KEY CORRECTIVE ACTIONS COMPLETED

- AN IN-DEPTH DISCUSSION WAS CONDUCTED WITH THE MEMBERS OF THE CREW INVOLVED IN THE EVENT. THE DISCUSSION INCLUDED MEMBERS OF UPPER STATION MANAGEMENT, THE CHIEF NUCLEAR ENGINEER, AND THE BWR OPERATIONS GENERAL MANAGER. A PRESENTATION OF THE EVENT SEQUENCE, THE PRELIMINARY INVESTIGATION RESULTS AND DISCUSSIONS WITH THE NRC WERE PROVIDED TO THE CREW MEMBERS.



## CREW PERFORMANCE (CONTINUED)

### KEY CORRECTIVE ACTIONS COMPLETED (CONTINUED)

- PRIOR TO ASSUMING THEIR SHIFT DUTIES, EACH OPERATING CREW WAS BRIEFED ON THIS EVENT BY UPPER STATION MANAGEMENT. DURING THESE BRIEFINGS, THE NEED FOR EFFECTIVE COMMUNICATION AND THE SCRE OVERSIGHT FUNCTION WERE STRESSED.
- THE CREW INVOLVED IN THIS EVENT RECEIVED REMEDIAL TRAINING ON OPERATING THE UNIT IN HOT STANDBY. THE TRAINING CONSISTED OF CLASSROOM AND SIMULATOR TRAINING. DISCUSSION TOPICS INCLUDED TEAMWORK, COMMUNICATIONS AND PROCEDURAL COMPLIANCE.
  - AUGMENTED MANAGEMENT OVERVIEW WAS PROVIDED FOR THE INVOLVED CREW IN THE INTERIM PERIOD PRIOR TO RECEIVING TRAINING.
- DETAILED CORPORATE INVESTIGATION HAS BEEN COMPLETED AND RECOMMENDATIONS ARE BEING ADDRESSED.
- THE ASSISTANT SUPERINTENDENT OF OPERATIONS' EXPECTATIONS FOR SHIFT TURNOVER AND BRIEFINGS HAVE BEEN CLARIFIED IN AN OPERATING MEMO.

## CREW PERFORMANCE (CONTINUED)

### KEY CORRECTIVE ACTIONS COMPLETED (CONTINUED)

- A NUMBER OF CHANGES HAVE BEEN MADE TO ENHANCE THE PROFESSIONAL ATMOSPHERE IN DAILY OPERATING ACTIVITIES:
  - QUIET TIME POLICY
  - REDUCTION IN NUISANCE CALLS TO THE SCRE AND SE
  - COMMUNICATION CONTROL DURING SURVEILLANCE TESTS
  - TRANSFER OF ADDITIONAL RESPONSIBILITIES TO SHIFT FOREMAN FROM SHIFT ENGINEER AND SCRE

### KEY CORRECTIVE ACTIONS TO BE COMPLETED

- THE NSO IS CURRENTLY OFF SHIFT AND PARTICIPATING IN A REMEDIATION PLAN. MANAGEMENT WILL ASSESS THE NSO'S PERFORMANCE UPON COMPLETION OF THE REMEDIATION PLAN IN ORDER TO DETERMINE WHEN HE MAY BE RETURNED TO NSO DUTIES. THE PRIMARY FOCUS OF THIS REMEDIATION PLAN WILL BE A HEIGHTENED AWARENESS OF ATTENTION TO DETAIL AND UNDERSTANDING OF REACTOR OPERATIONS.

## CREW PERFORMANCE (CONTINUED)

### KEY CORRECTIVE ACTIONS TO BE COMPLETED (CONTINUED)

- AN INDEPENDENT OVERVIEW OF THE SHIFT ACTIVITIES HAS BEEN CONDUCTED BY AN EXPERIENCED SHIFT SUPERVISOR FROM LASALLE STATION. THE REPORT OF HIS OBSERVATIONS IS UNDER REVIEW BY OPERATIONS MANAGEMENT. AN ACTION PLAN WILL BE DEVELOPED AND IMPLEMENTED BY JANUARY 31, 1991 IDENTIFYING ENHANCEMENTS TO SHIFT OPERATIONS.
- THE REQUIREMENTS FOR QUALIFIED NUCLEAR ENGINEER (QNE) SUPPORT IN THE CONTROL ROOM WILL BE REVISED TO REQUIRE A QNE TO BE PRESENT WHENEVER CONTROL ROD MANIPULATIONS ARE REQUIRED WITH REACTOR POWER BELOW 15% (EXCEPT FOR CONTROL ROD SURVEILLANCES) AND TO EVALUATE THE NEED FOR QNE SUPPORT FOR MAJOR ROD MANIPULATIONS ABOVE 15%. THESE CHANGES WILL BE COMPLETED BY JANUARY 15, 1991.

## CREW PERFORMANCE (CONTINUED)

- A COMMITTEE OF OPERATORS AND OPERATING MANAGEMENT WILL BE FORMED TO DISCUSS ENHANCED EXPECTATIONS FOR PLANT OPERATIONS. THIS COMMITTEE WILL BE CHAIRED BY THE ASSISTANT SUPERINTENDENT OF OPERATING. A REPORT ON RECOMMENDATIONS WILL BE ISSUED BY AUGUST 1, 1991 WHICH WILL:
  - CLARIFY EXISTING EXPECTATIONS FOR EACH OPERATING POSITION
  - FURTHER DELINEATE COMMAND AND CONTROL FUNCTIONS FOR THE CONTROL ROOM
  - EVALUATE LOG KEEPING REQUIREMENTS FOR ENHANCEMENTS/CLARIFICATIONS
  - EVALUATE SHIFT BRIEFING REQUIREMENTS FOR ENHANCEMENTS/CLARIFICATIONS
  - AS AN INTERIM MEASURE, THIS MONTH A LETTER WILL BE ISSUED SUMMARIZING OPERATING DEPARTMENT MANAGEMENT EXPECTATIONS FOR PLANT OPERATIONS.
  - AS AN ADDITIONAL INTERIM MEASURE, LICENSED OPERATORS WILL BE REQUIRED TO REVIEW THE EXPECTATIONS FOR THEIR POSITIONS AS CONTAINED IN ADMINISTRATIVE PROCEDURES. THIS WILL BE COMPLETED BY DECEMBER 15, 1991.



## PROCEDURES

### CONCLUSIONS

- PROCEDURES REPRESENT MANAGEMENT'S EXPECTATIONS AND PROVIDE DIRECTION ON HOW TO PERFORM ACTIVITIES
  - PROCEDURE TP 6303 AND QGP 2-4 "SHUTDOWN FROM POWER OPERATION TO A STANDBY HOT PRESSURIZED CONDITION" CAN BE AND SHOULD BE IMPROVED. THEY CONTAIN SEVERAL AMBIGUOUS STEPS.
  - PROCEDURE QGP 2-4 WAS USED SIX TIMES FROM 1988 TO 10/27/90 WHERE REACTOR PRESSURE WAS SUCCESSFULLY CONTROLLED WITH THE BYPASS VALVES CLOSED.
- IT IS COMMONWEALTH EDISON'S EXPECTATION THAT SUPERVISORS WILL RESOLVE PROCEDURAL DISCREPANCIES BY EITHER (1) DETERMINING THE METHODS BY WHICH THE ACTIVITY CAN BE PERFORMED USING THE PROCEDURE AS WRITTEN AND CONVEYING THIS TO THE INDIVIDUAL PERFORMING THE ACTIVITY OR (2) SUBMITTING A PROCEDURE CHANGE, EITHER TEMPORARY OR PERMANENT.
  - OUR GUIDANCE WAS NOT SUFFICIENTLY COMPREHENSIVE. CLARIFICATION OF AN ACTIVITY FOR PERSONNEL AS ALLOWED BY OPTION 1 DID NOT NECESSARILY RECOGNIZE THE POTENTIAL NEED FOR THAT CLARIFICATION TO BE DOCUMENTED FOR FUTURE USE BY OTHER OPERATORS.

## PROCEDURES (CONTINUED)

### KEY CORRECTIVE ACTIONS

- PROCEDURE QGP 2-4 WILL BE REVISED TO MEET CURRENT STATION PROCEDURE UPGRADE PROGRAM REQUIREMENTS BY APRIL 1, 1991. IN THE INTERIM, QGP 2-4 WILL BE REVISED BY JANUARY 31, 1991, TO INCORPORATE LESSONS LEARNED.
- THE PROCEDURE UPGRADE PROGRAM PRIORITIZATION FOR OPERATING PROCEDURES WILL BE REVIEWED TO DETERMINE IF SCHEDULE MODIFICATIONS ARE REQUIRED. THE REVIEW AND ANY SCHEDULE CHANGES WILL BE COMPLETED BY JANUARY 31, 1991.
- THE POLICY ON RESOLVING PROCEDURAL DISCREPANCIES WILL BE REVIEWED AND APPROPRIATE CHANGES MADE, INCLUDING DIRECTION ON THE DOCUMENTATION OF PROCEDURAL STEP CLARIFICATIONS. THE REVIEW AND ANY CHANGES WILL BE COMPLETED BY FEBRUARY 28, 1991
  - IN THE INTERIM, THIS MONTH A LETTER WILL BE ISSUED TO SPECIFY MANAGEMENT'S EXPECTATION IN THIS AREA.
- A STATION COMMITTEE (WHICH INCLUDES A CROSS SECTION OF MANAGEMENT AND UNION EMPLOYEES) HAS BEEN FORMED TO REVIEW AND EVALUATE THE ISSUE OF PROCEDURE USAGE. AN ACTION PLAN, BASED ON THIS COMMITTEE'S RESULTS, WILL BE DEVELOPED AND IMPLEMENTED BY FEBRUARY 28, 1991.
  - PART OF THIS PLAN WILL BE A METHOD TO EVALUATE ITS EFFECTIVENESS.

## TRAINING

### FACTS

- COMMONWEALTH EDISON HAS DEVELOPED A STRONG REACTIVITY AWARENESS TRAINING PROGRAM. THE CURRENT ISSUES ARE A RESULT OF AN INDIVIDUAL FAILURE TO UTILIZE THIS TRAINING NOT AN INDICATION OF A PROGRAMMATIC WEAKNESS.
- QUAD CITIES' LICENSED OPERATOR TRAINING PROGRAM IS DESIGNED TO FULLY MEET 10 CFR 55.59(C)1-7 AND, ADDITIONALLY, THE REQUIREMENTS OF ANSI 3.1, 1981 AND THE RECOMMENDATIONS OF INPO 86-025. EACH OF THESE DOCUMENTS LIST TOPICS AND EVOLUTIONS TO BE INCLUDED IN THE REQUALIFICATION PROGRAM BUT NONE CONTAIN THE EVOLUTION OF TAKING THE PLANT TO "HOT STANDBY".
- UNTIL 1990, LICENSED OPERATOR TRAINING WAS CONDUCTED AT THE GE DRESDEN 2 SIMULATOR WHICH CANNOT MODEL THE EVOLUTION OF PLACING THE REACTOR INTO "HOT STANDBY". HOWEVER, RELATED EVOLUTIONS SUCH AS HIGH XENON SCRAM RECOVERIES AND HIGH WORTH CONTROL RODS WERE CONDUCTED.
- THE QGP 2-4 PROCEDURE FOR "HOT STANDBY" IS A "READ AND DISCUSS" ITEM IN INITIAL LICENSE TRAINING.
- THE QGP 2-4 PROCEDURE FOR "HOT STANDBY" WAS INCLUDED AS A DISCUSSION ITEM IN THE 1987 CONTINUING TRAINING PROGRAM. ADDITIONALLY, A HIGH XENON, HOT SHUTDOWN CONDITION SCENARIO EXERCISE WAS CONDUCTED.

## TRAINING (CONTINUED)

- BASED ON THE INFREQUENCY OF "HOT STANDBY" OPERATION AND THE FACT THAT THE EVOLUTION COULD NOT BE PERFORMED ON THE GE SIMULATOR, THE TASKS ASSOCIATED WITH "HOT STANDBY" WERE REMOVED FROM THE REQUAL PROGRAM.

## CONCLUSIONS

- THERE HAD BEEN MINIMAL FORMAL TRAINING ON "HOT STANDBY" OPERATION, WHICH CONTRIBUTED TO THE EVENT.
- GIVEN THIS EVENT, AND LESSONS LEARNED, OUR TRAINING PROGRAM NEEDS TO BE ENHANCED WITH RESPECT TO HOT STANDBY OPERATION.
- WE MUST EVALUATE OTHER INFREQUENT OPERATIONS FOR SPECIFIC TRAINING NEEDS.

## KEY CORRECTIVE ACTIONS

- ALL LICENSED OPERATORS AND NUCLEAR ENGINEERS WILL BE TRAINED IN HOT STANDBY OPERATION BY MAY 1991. PARTICULAR EMPHASIS WILL BE PLACED ON SENSITIVITY OF THE REACTOR TO SMALL CHANGES IN REACTIVITY.
- THIS TRAINING CAN BE ACCOMPLISHED ON THE NEW SITE SIMULATOR.



## TRAINING (CONTINUED)

- A REVIEW OF APPROXIMATELY HALF OF THE STATION OPERATING PERSONNEL AND NUCLEAR ENGINEERS' ABILITY TO APPLY THEIR KNOWLEDGE OF REACTOR THEORY TO PRACTICAL, LOW POWER SITUATIONS WAS CONDUCTED. THE REVIEW CONSISTED OF 3 PLANT SPECIFIC SCENARIOS WHICH PLACED THE PARTICIPANT IN A HOT STANDBY OPERATING CONDITION. THE RESULTS OF THE REVIEW WILL BE USED TO DETERMINE IF ANY FURTHER TRAINING IS NECESSARY.
- THE ON-SITE REVIEW PROCEDURE WILL BE REVISED TO ENSURE THAT TRAINING IS EVALUATED AS PART OF THE REVIEW OF ANY SPECIAL TEST.
- THE STATION WILL NOT DELIBERATELY OPERATE IN THE HOT STANDBY MODE UNTIL TRAINING IS COMPLETE. IN THE INTERIM, IF HOT STANDBY OPERATION IS REQUIRED (DUE TO PLANT CONDITION), QGP 2-4 WILL BE REVISED TO CLARIFY PROCEDURAL STEPS AND AUGMENTED MANAGEMENT OVERSIGHT WILL BE PROVIDED.

## ASSESSMENT OF CREW AND INDIVIDUAL OPERATOR PERFORMANCE

### DISCUSSION

- A LICENSED OPERATOR PERFORMANCE EVALUATION IS CONDUCTED ON A YEARLY BASIS AND IS NORMALLY COMPLETED BY THE IMMEDIATE SUPERVISOR OF EACH LICENSED REACTOR OPERATOR OR SENIOR REACTOR OPERATOR. THIS EVALUATION PROVIDES AN OPPORTUNITY TO EVALUATE A LICENSE HOLDER'S DAY-TO-DAY PERFORMANCE. THE PERFORMANCE TRAITS THAT ARE EVALUATED ARE:
  - ABILITY TO MANIPULATE CONTROLS
  - KNOWLEDGE OF SYSTEMS
  - KNOWLEDGE OF PROCEDURES
  - ATTITUDE
  - RELIABILITY

THIS EVALUATION IS DOCUMENTED, REVIEWED BY OPERATIONS MANAGEMENT AND THEN BECOMES PART OF THE LICENSE HOLDER'S TRAINING FILES.

ASSESSMENT OF CREW AND  
INDIVIDUAL OPERATOR PERFORMANCE  
(CONTINUED)

- REVIEW OF INDIVIDUAL PERFORMANCE IS DONE FOR EACH PERSONNEL ERROR AS INPUT FOR LER/DVR, PERSONNEL ERROR EVALUATION PRESENTATION OR HUMAN PERFORMANCE ENHANCEMENT SYSTEM. FEEDBACK IS PROVIDED TO INDIVIDUALS BASED ON THIS REVIEW.
  
- UPPER STATEMENT MANAGEMENT PERFORMS QUARTERLY OVERVIEWS OF SIMULATOR AND CLASSROOM ACTIVITIES.
  
- OTHER ASSESSMENTS
  - CORPORATE PERFORMANCE ASSESSMENT DEPARTMENT
  
  - NUCLEAR QUALITY PROGRAMS DEPARTMENT
  
  - INPO

CONCLUSION

- MULTIPLE LICENSED OPERATOR ASSESSMENTS ARE CONDUCTED
  
- THESE ASSESSMENTS PROVIDE REASONABLE ASSURANCE THAT CREW AND INDIVIDUAL PERFORMANCE IS ACCEPTABLE.

## OTHER CORRECTIVE ACTIONS

- IRM RELIABILITY IMPROVEMENT PROGRAM
  - SHORT TERM GOALS (BY THE END OF THE UNIT ONE OUTAGE)
  - ALL IRMs WILL BE OPERABLE PRIOR TO UNIT ONE START-UP
    - REMOVE, INSPECT AND REPAIR AS NEEDED ALL DRIVES
    - DEVELOP AND IMPLEMENT SCHEDULE TO REPLACE PRE-AMPLIFIER CIRCUIT BOARDS
    - REPLACE DETECTORS WITHIN CONSTRAINTS OF PARTS AVAILABILITY
    - REPLACE RECORDERS
    - LONG TERM GOALS
      - EVALUATE ENTIRE IRM SYSTEM
      - REDUCE DETECTOR VIBRATION
        - INSTALL PERMANENT ACCELEROMETER ON EACH DRIVE
        - PERFORM VIBRATION ANALYSIS
        - PERFORM DRIVE PREVENTATIVE MAINTENANCE
      - REPLACE GE CONNECTORS



## OTHER CORRECTIVE ACTIONS

- THE RECOMMENDED CORRECTIVE ACTIONS IDENTIFIED IN THE CORPORATE INVESTIGATION OF THIS EVENT WILL BE EVALUATED FOR APPLICABILITY TO THE OTHER CEC<sub>o</sub> NUCLEAR PLANTS BY FEBRUARY 1, 1991.

## REVIEW OF THE INSPECTION REPORT CONCLUSIONS

### 1. CORRECTIVE ACTIONS BY THE SHIFT 1 OPERATING ENGINEER

- PROCEDURES ALLOW THE OE TO INITIAL A STEP THAT IS BEING PERFORMED PURSUANT TO HIS INTERPRETATION.
- THE ADDITION OF A NOTE TO STEP 38b WAS PROCEDURALLY ACCEPTABLE IN THAT IT WAS AN ATTEMPT TO EXPLAIN COMPLETION OF THE STEP AND NOT AN ATTEMPT TO CHANGE THE INTENT OF THE STEP.
- NOTWITHSTANDING THE ALLOWABLE ACTIONS TAKEN BY THE OE, CECO RECOGNIZES THE NEED TO MINIMIZE AND CONTROL INTERPRETATIONS OF PROCEDURES WITHOUT TEMPORARY OR PERMANENT PROCEDURE CHANGES. HOWEVER, WE DO NOT BELIEVE THAT THE OE'S ACTIONS ARE A VIOLATION OF 10 CFR PART 50, APPENDIX B, CRITERION XVI.

### 2. ADEQUACY OF HOT STANDBY PROCEDURE

- CECO BELIEVES THAT BECAUSE THE PROCEDURE HAS BEEN USED SUCCESSFULLY ON SEVERAL PRIOR OCCASIONS, IT SHOULD NOT BE CONSIDERED INADEQUATE.
- HOWEVER, OUR REVIEW OF THE PROCEDURE IN LIGHT OF THIS EVENT LEADS US TO CONCLUDE THAT THE PROCEDURE CAN BE AND SHOULD BE IMPROVED.
- ACCORDINGLY WE DO NOT BELIEVE THAT THE PROCEDURE CONSTITUTES A VIOLATION OF 10CFR PART 50, APPENDIX B, CRITERION V.

## REVIEW OF THE INSPECTION REPORT CONCLUSIONS (CONTINUED)

- 3a. OPERATING ENGINEER NOTIFICATION OF THE ON - DUTY NUCLEAR ENGINEER
- PROCEDURE QAP 200-4 REQUIRES THAT THE NUCLEAR ENGINEERING GROUP BE NOTIFIED OF ALL PLANNED REACTIVITY CHANGES, SUCH AS STARTUP, SHUTDOWN, AND MAJOR POWER CHANGES.
  - NUCLEAR ENGINEERING GROUP WAS INVOLVED IN TEST PLANNING AND THEREFORE WAS AWARE THAT SEVERAL REACTOR STATUS CHANGES WOULD OCCUR. THE LEAD NUCLEAR ENGINEER DEFINED THEIR INVOLVEMENT
  - THERE WAS NO REQUIREMENT TO AGAIN NOTIFY THE ON - DUTY NUCLEAR ENGINEER OR HAVE HIM PRESENT DURING ATTEMPT TO REACH HOT STANDBY. HOWEVER, A NUCLEAR ENGINEER WAS ON-SHIFT FOR IRM/APRM VERIFICATION, AND WAS AWARE OF THE PLANNED RETURN TO HOT STANDBY.
  - PROCEDURE ADHERANCE WAS ACHIEVED
  - PROCEDURES WILL BE MODIFIED TO REQUIRE A NUCLEAR ENGINEER'S PRESENCE DURING THIS EVOLUTION.
- 3b. SHIFT BRIEFING BY THE TEST DIRECTOR AND SHIFT ENGINEER
- PROCEDURE QAP 300-2 REQUIRES THAT COGNIZANT PERSONNEL SHOULD BRIEF SHIFT PERSONNEL INVOLVED IN AN EVOLUTION.
  - THE TEST DIRECTOR AND THE SHIFT ENGINEER WERE WORKING TOGETHER REGARDING THE TURBINE TORSIONAL TEST. ONCE THE TEST WAS TERMINATED, THE TEST DIRECTOR BELIEVED THAT HIS ROLE WAS COMPLETED PER THE PROCEDURE AND THAT IT WAS NOT NECESSARY FOR THE TEST DIRECTOR TO AGAIN BRIEF THE SHIFT ENGINEER.
  - IN HINDSIGHT, CEC<sub>o</sub> INCLUDING THE SHIFT ENGINEER, REALIZES THAT A TIMELY SHIFT BRIEFING BY THE SHIFT ENGINEER SHOULD HAVE BEEN PERFORMED TO INFORM THE CREW OF UPCOMING PLANT EVOLUTIONS.

## REVIEW OF THE INSPECTION REPORT CONCLUSIONS (CONTINUED)

### 3c. SCRE OVERSIGHT OF NSO ACTIVITIES

- CEC<sub>o</sub>, INCLUDING THE SHIFT 3 SCRE, AGREES THAT THE SCRE, BECAUSE OF OTHER ONGOING ACTIVITIES, DID NOT SATISFY THE LEVEL OF OVERSIGHT ANTICIPATED BY QAP 300-2, SECTION C.28. THIS FINDING ALONE HAS MINOR SAFETY SIGNIFICANCE.

### 3d. LOGGING OF ABNORMAL EVENTS

- AT THE TIME OF THE EVENT, IT WAS SHIFT 1 PERSONNELS' JUDGEMENT THAT THE HIGHER ROD WORTH WAS NOT AN ABNORMAL CONDITION.
- PROCEDURE ADHERANCE WAS ACHIEVED.
- IN HINDSIGHT, ENHANCED GUIDANCE FOR THE TYPES OF INFORMATION THAT SHOULD BE DOCUMENTED AND COMMUNICATED TO SUBSEQUENT OPERATING SHIFT SHOULD BE DEFINED BY THE OPERATORS FOR THEIR OWN USE.

### 3e. NSO PROCEDURE ADHERANCE

- AN EXCESSIVE FOCUS ON REACTOR PRESSURE DIVERTED THE NSO'S ATTENTION FROM OTHER IMPORTANT INDICATIONS.
- CEC<sub>o</sub>, INCLUDING THE SHIFT 3 NSO, AGREES THAT ADDITIONAL INDICATORS SHOULD HAVE BEEN OBSERVED DURING THE TRANSITION TO HOT STANDBY.
- AS A RESULT OF FAILING TO OBSERVE THESE INDICATORS, CEC<sub>o</sub>, INCLUDING THE SHIFT 3 NSO, AGREES THAT THE SHIFT 3 NSO DID NOT PROPERLY INSERT SRMS, PROPERLY RANGE IRMS, OR INITIATE HOLD POINTS DURING THE ATTEMPT TO REACH HOT STANDBY.



## OPERATORS BACKGROUND

## BRIAN R. STRUB

EDUCATION    B.S. ENGINEERING SCIENCE - IOWA STATE  
UNIVERSITY  
MS NUCLEAR ENGINEERING - IOWA STATE  
UNIVERSITY

### CECo EXPERIENCE

- 14 YEARS AT QUAD CITIES STATION
  - 8 YEARS IN TECHNICAL STAFF (MAJORITY OF TIME IN NUCLEAR GROUP)
  - 4 YEARS AS LEAD NUCLEAR ENGINEER
  - 1 YEAR AS COMPLIANCE ENGINEER
  - 5 YEARS AS AN OPERATING ENGINEER
- SENIOR REACTOR OPERATOR LICENSE RECEIVED APRIL, 1984

JEFFREY J. KOPACZ

EDUCATION    B.S. MECHANICAL ENGINEERING-UNIVERSITY  
OF NOTRE DAME

CECo EXPERIENCE

- 12 YEARS AT QUAD CITIES STATION
  - 5 YEARS IN TECHNICAL STAFF ENGINEER
  - 1 YEAR AS MAINTENANCE STAFF ENGINEER
  - 1 YEAR ON SHIFT; AS SHIFT FOREMAN AND SCRE
  - 4 YEARS ON TECHNICAL STAFF AS THE ASSISTANT  
TECHNICAL STAFF SUPERVISOR AND, LATER,  
TECHNICAL STAFF SUPERVISOR
  - 1.5 YEARS OPERATING ENGINEER
- SENIOR REACTOR OPERATOR LICENSE RECEIVED IN  
APRIL, 1984

## HARVEY K. HUISINGH

EDUCATION    HIGH SCHOOL

### CECo EXPERIENCE

- 20 YEARS AT QUAD CITIES STATION
  - 5 YEARS AS AN EQUIPMENT ATTENDENT
  - 2 YEARS AS AN EQUIPMENT OPERATOR
  - 4 YEARS AS RADWASTE FOREMAN
  - 5 YEARS AS OPERATING SHIFT FOREMAN
  - 4 YEARS AS SHIFT ENGINEER
- SENIOR REACTOR OPERATOR LICENSE RECEIVED IN AUGUST, 1977

### MILITARY SERVICE

6 YEARS IN U.S. NAVY (NUCLEAR)



## RONALD K. RUSTICK

EDUCATION    B.S. ELECTRICAL ENGINEERING UNIVERSITY OF  
WISCONSIN

### CECo EXPERIENCE

- 7 YEARS AT QUAD CITIES STATION
  - 5 YEARS AS TECHNICAL STAFF ENGINEER
  - 1 YEAR AS MAINTENANCE STAFF ASSISTANT  
(ELECTRICAL MAINTENANCE DEPARTMENT)
  - 1 YEAR AS TECHNICAL STAFF ELECTRICAL GROUP  
LEADER
  - 1 3/4 YEARS AS A SCORE
- SENIOR REACTOR OPERATOR LICENSE RECEIVED IN  
FEBRUARY, 1988

### MILITARY SERVICE

4 YEARS IN U.S. MARINE CORPS

## STEVEN C. GORDON

EDUCATION    HIGH SCHOOL

### CECo EXPERIENCE

- 15 YEARS AT QUAD CITIES STATION
  - 2½ YEARS AS EQUIPMENT ATTENDANT
  - 3½ YEARS AS EQUIPMENT OPERATOR
  - 9 YEARS AS NUCLEAR STATION OPERATOR
- REACTOR OPERATOR LICENSE RECEIVED IN AUGUST, 1978

### MILITARY SERVICE

4 YEARS IN UNITED STATES COAST GUARD

2 YEARS INACTIVE UNITED STATES COAST GUARD