

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-265/88024(DRP)

Docket No. 50-265

License No. DPR-30

Licensee: Commonwealth Edison Company  
Post Office Box 767  
Chicago, IL 60690

Facility Name: Quad Cities Nuclear Power Station, Unit 2

Meeting Location: Region III Office, Glen Ellyn, IL

Meeting Conducted: August 26, 1988

Inspectors: R. L. Higgins  
A. D. Morrongiello

Approved By: M. A. Ring, Chief *MAR*  
Reactor Projects Section 1B

*9/14/88*  
Date

Meeting Summary

Meeting on August 26, 1988 (Report No. 50-265/88024 (DRP))

Subjects Discussed: Weakness identified in verification of component operability as documented in Inspection Reports 50-254/88015(DRP) and 50-265/88015(DRP); and the licensee's corrective actions to upgrade their surveillance program.

## DETAILS

### 1. Attendees

#### Commonwealth Edison Company (CECo)

D. Galle, Vice President BWR Operations  
L. DelGeorge, Asst. Vice President Licensing and Plant Support Services  
N. Kalivianakis, General Manager, BWR  
J. S. Abel, Manager, BWR, Engineering  
B. B. Palagi, Superintendent of Analysis, Nuclear Fuel Services  
C. E. Beck, BWR Engineering  
N. P. Smith, BWR Licensing Supervisor  
I. M. Johnson, Nuclear Licensing Administrator  
R. L. Bax, Station Manager, Quad Cities  
G. Spedl, Asst. Superintendent of Technical Services, Quad Cities  
J. W. Wethington, QA Superintendent, Quad Cities  
S. L. Trubatch, Senior Regulatory Consultant, Tenera

#### U.S. Nuclear Regulatory Commission

C. J. Paperiello, Deputy Regional Administrator  
W. L. Forney, Branch Chief/Deputy Division Director, Division of Reactor  
Projects  
M. A. Ring, Section Chief  
B. Berson, Regional Counsel  
B. Stapleton, Enforcement Specialist  
R. L. Higgins, Senior Resident Inspector, Quad Cities  
A. D. Morrongiello, Resident Inspector, Quad Cities

### 2. Areas Discussed

Mr. Forney stated that the purpose of the meeting was for the licensee to discuss the corrective actions implemented for the violation identified in Inspection Report 265/88015(DRF).

Mr. Morrongiello presented a brief description of the issue which was documented in Inspection Report 88015. Attachment 1 is a copy of the overheads which were used to make the presentation.

The licensee presented a detailed description of the event, immediate corrective actions, and CECo's view of the event's safety significance. The handouts used for this presentation are included as Attachment 2 to this report. The licensee stated that it was their intention to review other situations where other devices have two power supplies and an auto transfer feature, and equipment with more than one electrical path for start, stop or control functions, to determine if adequate testing has been done. Surveillances will be added or modified where a need to do so is identified.

The above plan was to be accomplished in three phases. The first phase consisted of reviewing all safety related schematic drawings with similar potential wiring errors, determine which were tested, and for those not tested include them in the surveillance program. The second phase would assure that all safety related equipment is being tested adequately under the present surveillance program. The third phase will be to transfer Quad Cities lessons learned to Dresden.

The meeting was concluded with NRC stating that the program described during the meeting by the licensee appeared to adequately address the identified concerns. The NRC requested that the lessons learned be applied to all Commonwealth Edison plants and that the resident inspectors be kept apprised of the program's progress and results.

QUAD CITIES ENFORCEMENT CONFERENCE

MOTOR CONTROL CENTER TRANSFER CAPABILITY

AUGUST 26, 1988

AGENDA

INTRODUCTORY REMARKS	E. G. GREENMAN
TECHNICAL ISSUES	A. D. MORRONGIELLO
LICENSEE RESPONSE	COMMONWEALTH EDISON COMPANY
CLOSING COMMENTS	E. G. GREENMAN

MAJOR TECHNICAL ISSUE

MOTOR CONTROL CENTER 28/29-5 WAS INCAPABLE OF  
AUTOMATICALLY TRANSFERRING POWER TO ITS BACKUP SUPPLY  
UPON LOSS OF ITS NORMAL POWER SUPPLY, AS STATED IN  
THE FSAR.

## NRC ANALYSIS

### MANAGEMENT

STATION MANAGEMENT FAILED TO RECOGNIZE THE INVALID WAY THAT THE AUTOMATIC TRANSFER FEATURE WAS TESTED.

### ENGINEERING AND DESIGN

THE DESIGN OF THE AUTOMATIC TRANSFER FEATURE AS ORIGINALLY PROPOSED APPEARED ADEQUATE. (THE MODIFICATION TO REMOVE DC POWER INTERLOCKS WAS IN RESPONSE TO A CONCERN THAT LOSS OF DC POWER WOULD HAVE PREVENTED THE AUTOMATIC TRANSFER).

### INSTALLATION

THE QUALITY CONTROL PROGRAM THAT WAS IN EXISTENCE AT THAT TIME WAS INEFFECTUAL IN DETECTING THE ERROR.

### TESTING

TESTING WAS ALWAYS INADEQUATE.

## VIOLATION

TITLE 10 OF THE CODE OF FEDERAL REGULATIONS PART 50, APPENDIX A, DESIGN CRITERION 17, ELECTRIC POWER SYSTEMS, STATES, IN PART, THAT THE ONSITE ELECTRIC DISTRIBUTION SYSTEM SHALL HAVE SUFFICIENT REDUNDANCY TO PERFORM THE SAFETY FUNCTIONS ASSUMING A SINGLE FAILURE.

QUAD CITIES FINAL SAFETY ANALYSIS REPORT, SECTION 8.2.3.1, REQUIRES THAT THE BREAKERS FEEDING 480 VOLT MOTOR CONTROL CENTER 28/29-5 FROM 480 VOLT BUS 29 WILL OPEN AUTOMATICALLY AND THE BREAKER FEEDING 480 VOLT MOTOR CONTROL CENTER 28/29-5 FROM 480 VOLT BUS 28 WILL CLOSE AUTOMATICALLY TO SUPPLY MOTOR CONTROL CENTER 28/29-5 FROM DG 1/2 SHOULD DG 2 FAIL DURING A LOSS OF OFFSITE POWER.

CONTRARY TO THE ABOVE, A WIRING ERROR WAS DISCOVERED ON JUNE 22, 1988, WHICH WOULD PREVENT THE AUTOMATIC TRANSFER OF THE AC FEED FOR MCC 28/29-5 FROM BUS 29 TO BUS 28 DURING LOSS OF OFFSITE POWER CONCURRENT WITH A FAILURE OF DG 2. THIS WIRING ERROR WAS MADE DURING CONSTRUCTION AND HAS EXISTED THROUGHOUT THE LIFE OF THE PLANT.

AUGUST 26, 1988

QUAD CITIES ENFORCEMENT CONFERENCE

CONCERNING

VERIFICATION OF COMPONENT OPERABILITY



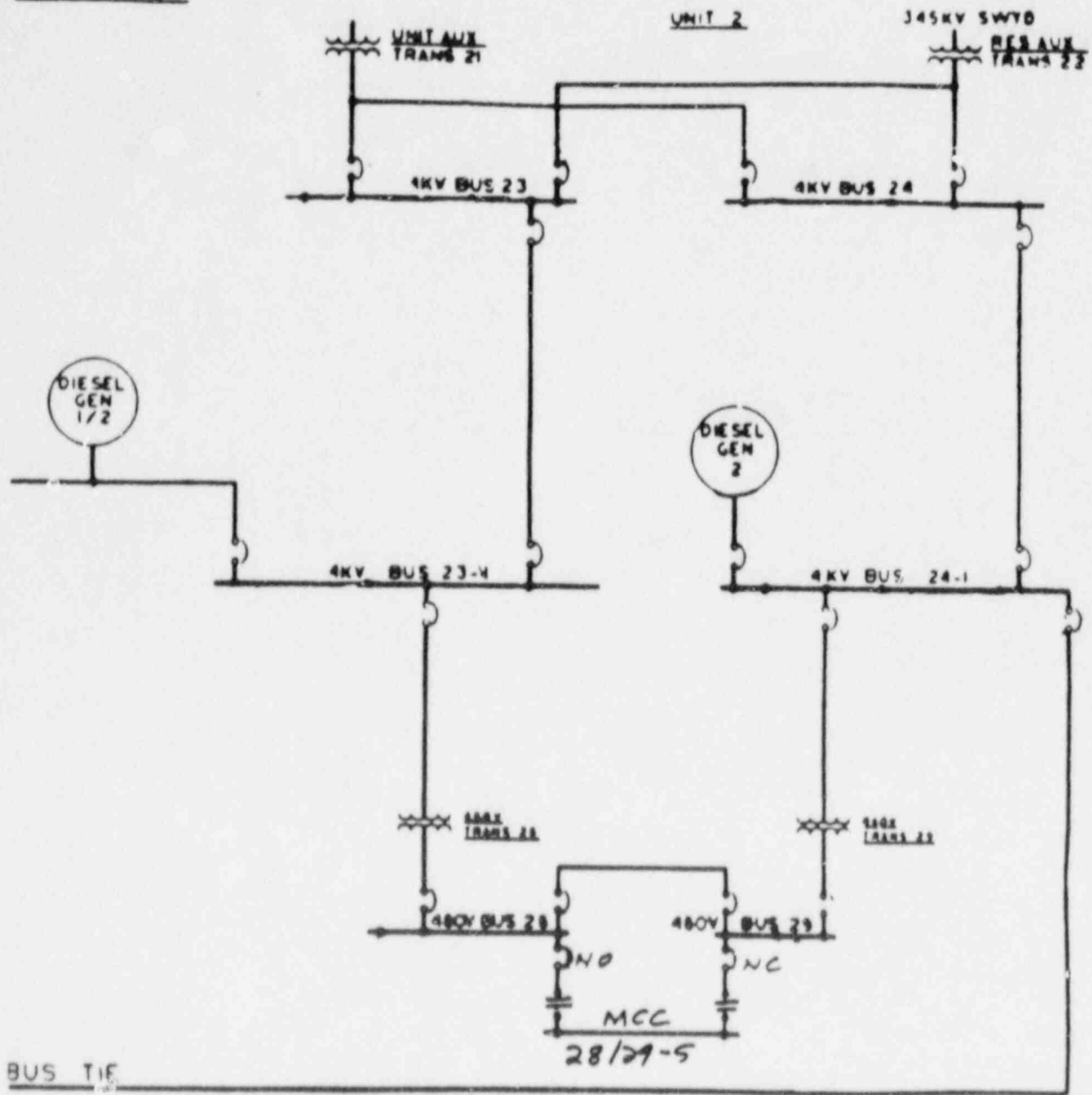
## AGENDA

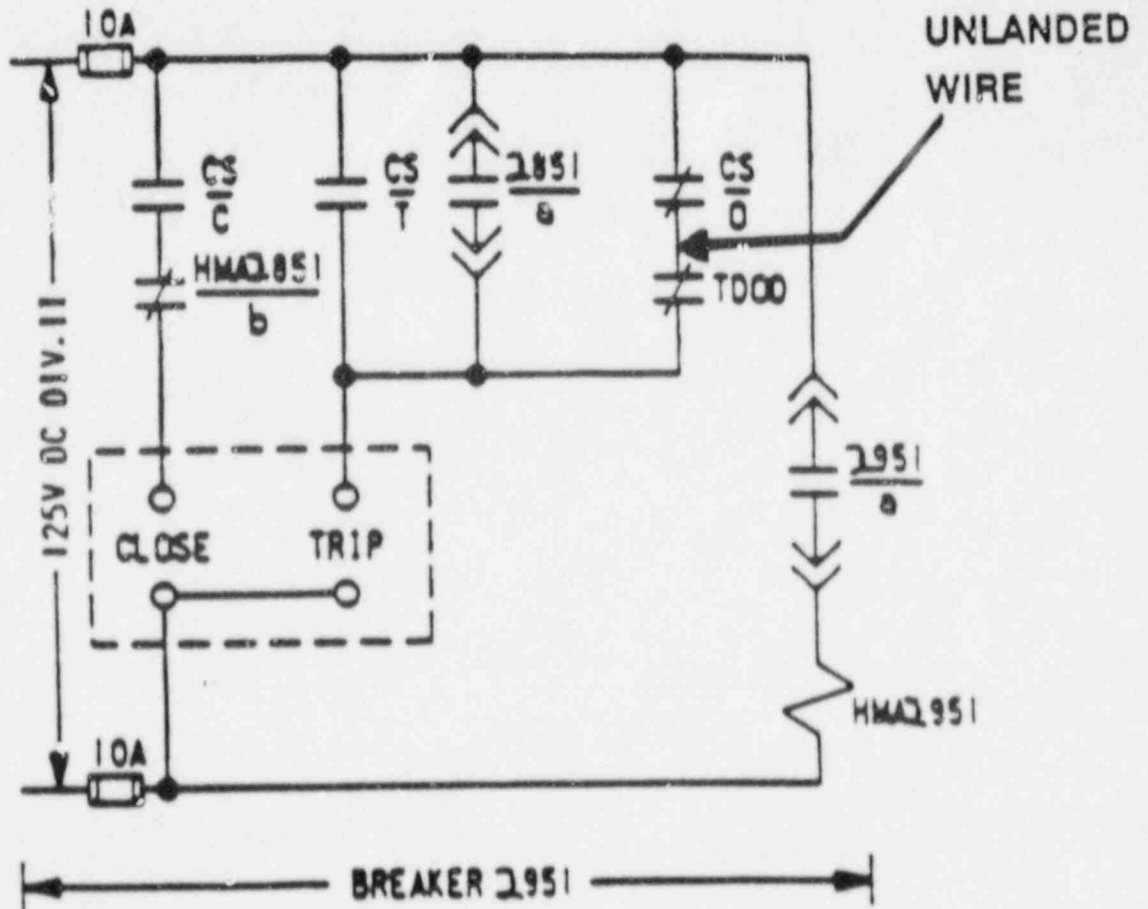
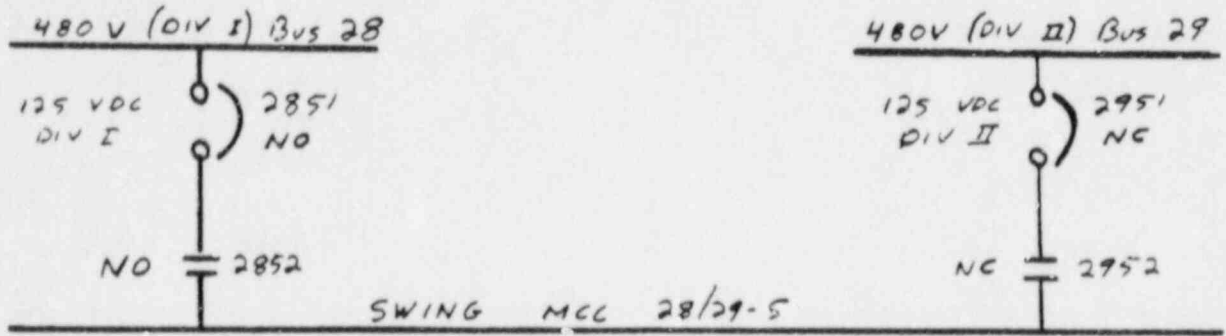
- INTRODUCTION R. L. BAX
- EVENT DESCRIPTION C. E. BECK
- CORRECTIVE ACTIONS J. S. ABEL
- SAFETY SIGNIFICANCE J. S. ABEL
- REVIEW OF PRIOR OPPORTUNITIES  
LER'S  
SURVEILLANCE PRACTICES G. F. SPEDL
- ENFORCEMENT POLICY CONSIDERATIONS L. O. DELGEORGE
- CONCLUDING REMARKS D. P. GALLE

## EVENT DESCRIPTION

- FOUND UNLANDED LEAD IN RHR SWING MOTOR CONTROL CENTER (MCC) DURING A MODIFICATION TEST.
  - DISCOVERED 06/22/88 AT 5:00 PM.
  - IMMEDIATE INVESTIGATION STARTED.
  - REPORTED VIA RED PHONE CALL AT 7:50 PM.
  - REPAIRED AND COMPLETED MOD TEST PRIOR TO 9:00 PM.
  - ESTABLISHED TASK FORCE.
  
- POWER TO LPCI INJECTION VALVES FOR BOTH DIVISIONS AFFECTED.
  
- DISCOVERED BECAUSE NEW MODIFICATION PROGRAM REQUIRES DETAILED TESTING AND ACCEPTANCE CRITERIA.
  - WALKDOWN WAS PERFORMED IN PLANNED WORK LOCATION.
  
- MOD ACCEPTANCE TEST INCLUDED VERIFICATION OF AUTOMATIC TRANSFER OF THE RHR SWING MCC.
  
- RHR SWING MCC FAILED TO TRANSFER DURING INITIAL MOD TEST. STATION PERSONNEL INVESTIGATED, FOUND UNLANDED WIRE.
  
- ENGINEERING REVIEW SHOWED THAT THE MISSING WIRE WOULD INHIBIT AUTOMATIC TRANSFER. MANUAL ACTION BY THE OPERATOR WOULD STILL BE EFFECTIVE.

QUAD-CITIES





(Simplified for clarity)

## CORRECTIVE ACTIONS

- IMMEDIATE CORRECTIVE ACTIONS
  - RELANDED THE CONDUCTOR
  - REPEATED MOD TEST; NO FURTHER DISCREPANCIES NOTED
  
- SHORT TERM CORRECTIVE ACTION
  - VERIFIED THE WIRE LANDED CORRECTLY ON QUAD CITIES UNIT 1 AND DRESDEN UNITS 2 AND 3.
  - QUAD CITIES TO ADD SURVEILLANCE OF LPCI SWING MCC.
  
- LONG TERM CORRECTIVE ACTION
  - ESTABLISHED AN ACTION PLAN IN THREE PHASES TO ADDRESS ISSUES RAISED BY THIS EVENT.
  
  - PHASE I OF THE ACTION PLAN IS ABOUT 75% COMPLETE. PHASE II IS ABOUT 25% COMPLETE. PHASE III IS UNDER DEVELOPMENT.

## BASES FOR "ACTION PLAN"

- TASK FORCE ESTABLISHED WITHIN ONE WEEK OF DISCOVERY OF CONDITION.
  
- EVALUATED REASON WIRING ERROR NOT DETECTED.
  
- CONCLUDED THAT ACTION PLAN SHOULD FOCUS ON THREE AREAS:
  - DEVICES WITH TWO POWER SUPPLIES AND AUTO TRANSFERS.
  
  - EQUIPMENT WITH MORE THAN ONE ELECTRICAL PATH FOR START, STOP OR CONTROL FUNCTIONS.
  
  - QUAD CITIES LESSONS LEARNED TRANSFERRED TO DRESDEN.
  
- THESE WERE CHOSEN BECAUSE:
  - AUTO TRANSFER DEVICES
    - ROUTINE AVAILABILITY TO NORMAL POWER MASKS INABILITY TO AUTO-TRANSFER.
    - NOT OFTEN CALLED UPON TO OPERATE.
  
  - PARALLEL START/STOP/CONTROL FEATURES
    - ROUTINE SURVEILLANCES VERIFY ONE PATH, BUT DO NOT ADDRESS OTHERS, COULD MASK A WIRING PROBLEM.
  
  - QUAD CITIES LESSONS LEARNED TRANSFERRED TO DRESDEN.
    - DRESDEN SAME VINTAGE AS QUAD CITIES STATION.

## STATUS OF ACTION PLAN

### PHASE I (UNITS 1 AND 2)

- PHASE 1 BELIEVED TO ADDRESS ALL EQUIPMENT WITH SIMILAR POTENTIAL WIRING ERRORS.
  - REVIEW SAFETY RELATED SCHEMATIC DRAWINGS, IDENTIFY SAFETY RELATED AUTO-THROW-OVER DEVICES. (27)  
COMPLETED
  - REVIEW STATION SURVEILLANCES. DETERMINE WHICH AUTO-THROW-OVER DEVICES ARE PERIODICALLY TESTED. (18)  
COMPLETED
  - FOR THOSE NOT TESTED (9),
    - CIRCUIT INTEGRITY VERIFIED.
    - PERIODIC SURVEILLANCE RECOMMENDATION BY  
MID-SEPTEMBER.

0167W

## STATUS OF ACTION PLAN

(CONT'D)

### PHASE II (UNIT 1)

- PHASE II IS BEING PERFORMED TO PROVIDE ADDITIONAL ASSURANCES THAT ALL SAFETY RELATED EQUIPMENT IS BEING ADEQUATELY TESTED UNDER THE PRESENT SURVEILLANCE PROGRAM.
  - REVIEW THE SAFETY RELATED DRAWING LIST. OBTAIN COPIES OF ALL SAFETY RELATED SCHEMATIC (AND SOME WIRING) DIAGRAMS.  
COMPLETED
  - REVIEW EACH DRAWING. LIST EQUIPMENT WITH PARALLEL START/STOP/CONTROL FEATURES (APPROXIMATELY 175).  
COMPLETED
  - SEPARATE INTO RELATED CATEGORIES.  
COMPLETED
  - REVIEW STATION SURVEILLANCE PROCEDURES TO DETERMINE WHICH DEVICES (OR GENERIC CATEGORIES) ARE ADEQUATELY COVERED.  
SCHEDULE FOR COMPLETION WILL BE ESTABLISHED BY MID-SEPTEMBER



STATUS OF ACTION PLAN

(CONT'D)

PHASE III

- PHASE III WILL PROVIDE ADDITIONAL ASSURANCES THAT QUAD CITIES LESSONS LEARNED WILL BE TRANSFERRED TO DRESDEN.

- PENDING COMPLETION OF QUAD CITIES PHASES I & II.

## EVALUATION OF SAFETY SIGNIFICANCE

- WIRING ERROR COULD PREVENT AUTOMATIC RHR INJECTION UNDER GIVEN SIMULTANEOUS LOCA, LOOP, LOSS OF UNIT 2 DIESEL.
- SITE SPECIFIC AND GENERALLY APPLICABLE CALCULATIONS SHOW PROBABILITY OF THESE SIMULTANEOUS OCCURRENCES LESS THAN  $3 \times 10^{-7}$  EVENTS PER YEAR.
- SINGLE CORE SPRAY PUMP OPERATION ORIGINAL LICENSE BASIS FOR PLANT. HOWEVER, TODAY'S APPENDIX K ANALYSIS DOES NOT ADDRESS THIS CONFIGURATION.
- EMERGENCY OPERATING PROCEDURES WOULD DIRECT OPERATOR TOWARD RESTORING POWER TO THE RHR SWING MCC.
- THEREFORE, ALTHOUGH EVENT CONSEQUENCES POTENTIALLY SIGNIFICANT, PROBABILITY OF OCCURRENCE EXTREMELY LOW, AND OPERATOR WOULD LIKELY RESPOND PROPERLY.

## REVIEW OF PRIOR OPPORTUNITIES

- PRE-OP TESTING SHOULD HAVE AFFORDED OPPORTUNITY FOR DISCOVERY
  - REVIEW OF TEST DOCUMENTATION IDENTIFIED NO APPLICABLE TESTING.
  
- LER REVIEW OF PAST EVENTS
  - TWO EVENTS IDENTIFIED AS INVOLVING THIS TRANSFER LOGIC HOWEVER, NEITHER PROVIDED REASONABLE OPPORTUNITY FOR OPERATOR TO IDENTIFY ERROR DUE TO MULTIPLE OPERATIONAL ACTIVITIES WHICH OCCUR DURING THOSE EVENTS.
  
  - NOTHING ABOUT EVENT WOULD HAVE ALERTED OPERATOR/POST EVENT REVIEW TO DISCOVER PROBLEM BECAUSE EQUIPMENT ENERGIZED BY (DEAD) MCC NOT CALLED UPON TO OPERATE.
  
- SURVEILLANCES REQUIRED BY TECH SPEC'S
  - LPCI LOGIC SYSTEM FUNCTIONAL TEST
  
  - DIESEL GENERATOR LOOP WITH ECCS SIGNAL TEST
  
  - TESTS DESIGNED FOR COMPLIANCE WITH TECH SPECS NOT INTENDED TO TEST AUX POWER SYSTEM AS A WHOLE. THEREFORE DID NOT ADDRESS AUTO-TRANSFER.

## REVIEW OF PRIOR OPPORTUNITIES

(CONT'D)

- ALTHOUGH UNDERVOLTAGE CALIBRATION/TESTING PERFORMED, THROWOVER NOT TYPE OF UNDERVOLTAGE RELAY NORMALLY TESTED
  
- ALTHOUGH SEVERAL MANUAL OPERATIONS PERFORMED WITH CONTROL SWITCH, CONTROL SWITCH BYPASSED UNLANDED LEAD
  
- HISTORICAL PERSPECTIVE
  - NO PREVIOUS LER'S IDENTIFIED ASSOCIATED WITH INITIAL INSTALLATION WIRING ERROR'S (THIS EVENT IS THE FIRST)
  
  - ONLY ONE DEVIATION REPORT IDENTIFIED WITH INITIAL INSTALLATION WIRING ERROR (REVERSED POLARITY ON D.C. CAPACITOR IN FIRE PROTECTION SYSTEM)
  
  - NO LER'S ASSOCIATED WITH INADEQUATE SURVEILLANCE IN PAST THREE YEARS

### SUMMARY

NEITHER PREVIOUS EVENTS NOR TECH SPEC SURVEILLANCES PRESENTED A REASONABLE OPPORTUNITY TO DISCOVER

## ENFORCEMENT POLICY CONSIDERATIONS

- PROMPT IDENTIFICATION AND REPORTING
  - ORIGINAL CONSTRUCTION
  
  - LIMITED OPPORTUNITY TO DISCOVER
  
  - PROMPT AND COMPLETE REPORT
  
- CORRECTIVE ACTION TO PREVENT RECURRENCE
  - PRIOR CORRECTIVE ACTIONS
    - NEW MODIFICATION PROGRAM WORKING
    - REQUIRED COMPREHENSIVE TESTING
    - REQUIRED REVIEW OF TEST DISCREPANCIES
  
  - REVIEW FOR ADDITIONAL UNTESTED COMPONENTS
    - AUTO-TRANSFER DEVICES
  
    - COMPONENTS IN PARALLEL START/STOP/CONTROL CIRCUITS
  
    - VERIFY COMPONENTS AND CIRCUITS IDENTIFIED IN REVIEW PERFORM AS DESIGNED
  
    - ADDITIONALLY, LOOKED AT DRESDEN AUTO-TRANSFER DEVICES (LPCI SWING MCC)
  
  - ADDITIONAL AUX POWER SURVEILLANCE PROCEDURES WILL BE DEVELOPED IF REQUIRED TO ENSURE OPERABILITY, PENDING COMPLETION OF REVIEW
  
  - QUAD CITIES LESSONS LEARNED WILL BE TRANSFERRED TO DRESDEN.

ENFORCEMENT POLICY CONSIDERATIONS

(CONT'D)

- PAST PERFORMANCE

- GOOD SALP RATINGS/EXTENDED SALP REVIEW PERIOD

- VIOLATIONS IN PAST THREE YEARS

	LEVEL IV	LEVEL V
DIESEL GENERATOR SYSTEMS	0	0
AUX POWER SYSTEMS	0	0
SURVEILLANCES	0	0

- TWO LER'S IN PAST 3 YEARS RELATED TO WIRING ERRORS

- MODIFICATION RELATED

- 87-01 - D/G GROUND

- ORIGINAL CONSTRUCTION

- 88-23 - ORIGINAL CONSTRUCTION ERROR (TODAY'S DISCUSSIONS)

- NO LERS ASSOCIATED WITH INADEQUATE SURVEILLANCES IN PAST 3 YEARS.

- CLEARLY DEMONSTRATES GOOD PAST PERFORMANCE

- PRIOR NOTICE OF SIMILAR EVENTS

- NO REASONABLE OPPORTUNITY TO IDENTIFY.

- MULTIPLE OCCURRENCES

- SINGLE EVENT