

Commonwealth Edison Company
Quad Cities Generating Station
22710 206th Avenue North
Cordova, IL 61242-9740
Tel 309-654-2241



ESK-96-224

December 12, 1996

U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Response to An Apparent Violation in Inspection Report Nos.
50-237/96012(DRS); 50-249/96012(DRS); 50-254/96016(DRS);
50-265/96016(DRS)
Protection of Motor Operated Valves During Postulated Hot Shorts
NRC Docket Nos. 50-237/249 and 50-254/265

Reference: NRC Inspection Report Nos. 50-237/96012(DRS); 50-249/96012(DRS);
50-254/96016(DRS); 50-265/96016(DRS), dated November 14, 1996.

The Reference Inspection Report discusses the results of the NRC staff's special inspection regarding fire protection issues at Dresden and Quad Cities. In the Reference NRC Inspection Report, the NRC staff identified one apparent violation that is being considered for escalated enforcement action for Dresden and Quad Cities. In lieu of a predecisional enforcement conference, ComEd is submitting this letter in response to the Inspection Report.

The apparent violation identifies a concern with the protection of motor operated valves during a postulated control room fire leading to a "hot short". Under certain limited conditions, a fire induced hot short in the control circuit of a motor operated valve can lead to spurious valve operation and mechanical damage to the valve operator.

ComEd concurs that "hot shorts" with possible mechanical damage to the valve is a valid technical issue which is applicable to Dresden and Quad Cities Stations. We have expeditiously taken action at both sites to minimize its impact. However, ComEd does not believe this issue was part of our original design basis.

The circumstances surrounding the apparent violation, ComEd's response to these circumstances, the corrective actions already taken for the technical issue, and the significance of the issue are discussed in the attachment to this letter. The Quad Cities and Dresden responses may be found in Attachments A and B respectively. Attachment C provides the additional information requested in the Inspection Report.


By separate correspondence, ComEd will provide additional information with respect to the other ComEd sites and corporate and/or site engineering staff conservative recommendations.

9612190437 961212
PDR ADOCK 05000237
G PDR

December 12, 1996

ComEd appreciates the opportunity to respond to these concerns. If there are any further questions regarding this issue, please contact either Charles Peterson at Quad Cities or Frank Spangenberg at Dresden Station.

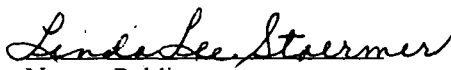
Respectfully,


E. S. Kraft, Jr.
Site Vice President
Quad Cities Station

Attachments (A), Quad Cities' Response to An Apparent Violation
(B), Dresden's Response to An Apparent Violation
(C), Request for Additional Information

cc: A. B. Beach, Regional Administrator - RIII
C. L. Vandermiet, Senior Resident Inspector - Dresden
C. G. Miller, Senior Resident Inspector - Quad Cities
J. F. Stang, Project Manager - NRR
R. M. Pulsifer, Project Manager - NRR
Office of Nuclear Facility Safety - IDNS
R. J. Singer, MidAmerican Energy
D. C. Tubbs, MidAmerican Energy
DCD License (both electronic and hard copy)

Subscribed and Sworn to before me on this
13 day of Dec., 1996


Notary Public



ATTACHMENT A (Page 1 of 2)
ESK-96-224

**Response to An Apparent Violation in Inspection Report Nos. 50-237/96012(DRS);
50-249/96012(DRS);50-254/96016(DRS);50-265/96016(DRS)**
For Quad Cities Station

STATEMENT OF APPARENT VIOLATION

The failure to provide adequate protection to ensure operation of equipment necessary to achieve or maintain hot shutdown is considered an apparent violation of 10CFR50, Appendix R, III.G.2 and III.G.3.

REASON FOR VIOLATION

Quad Cities Station agrees with the violation. The cause of the event was a cognitive design analysis review error in that the original methodology used to review circuit failure modes for Appendix R safe shutdown (SSD) did not include mechanical damage from fire induced hot shorts as a failure mode.

Quad Cities Station was analyzed for the effects of hot short induced spurious operation of valves for each of the sixteen (16) SSD paths. However, the analysis did not address the potential for a hot short to bypass the torque and limit switches, which in some instances could result in damage to the valve or actuator. The resulting damage could potentially prevent the subsequent valve positioning required for performance of the safe shutdown procedure.

CORRECTIVE ACTIONS TAKEN AND RESULTS ACHIEVED

On July 8, 1996, as a result of an independent self assessment of fire protection, Quad Cities identified its vulnerability to hot short induced mechanical damage. A Problem Identification Form (PIF) was initiated.

The affected SSD paths were immediately declared inoperable and a subsequent ENS notification was made. Licensee Event Report 96-011 was submitted on August 7, 1996.

A thorough analysis was performed of all one hundred fourteen (114) Motor Operated Valves (MOV) required for SSD. The analysis identified MOVs vulnerable to a single fire induced hot short that could lead to self-disabling damage.

Prior to declaring the SSD paths operable, the circuitry of fifty nine (59) valves was modified to eliminate the vulnerability to fire induced hot shorts. The remaining fifty five (55) valves were not modified due to analyses either concluding that the valves were not susceptible to damage [seven (7) valves] or that revision of procedures adequately addressed the issue [forty eight (48) valves]. In addition, all sixteen (16) SSD procedures were revised so that procedural actions would be in place to mitigate the affects of a fire induced hot short.

ATTACHMENT A (Page 2 of 2)
ESK-96-224

**Response to An Apparent Violation in Inspection Report Nos. 50-237/96012(DRS);
50-249/96012(DRS);50-254/96016(DRS);50-265/96016(DRS)
For Quad Cities Station**

Discussion of Delayed Correction

The conditions noted in IEN 92-18 were reviewed by Quad Cities Station. The closure of this review in March 1994 concluded that this issue did not apply to Quad Cities, primarily because MOV thermal overloads were not bypassed. In 1996, information indicating that thermal overload protection retained in the circuit may not protect a MOV, became available to Quad Cities. This initiated our second review of IEN 92-18. Quad Cities' corrective actions occurred expeditiously upon determination that the technical issue had not been adequately resolved.

Currently, information notices are screened for applicability to Quad Cities, assigned a responsible department and assigned a tracking number to ensure timely completion. See Attachment C for further details.

ACTIONS TO PREVENT FURTHER OCCURRENCE

The site has taken steps to emphasize more conservative decision making when resolving engineering issues as evidenced by the number of issues recently reviewed and resolved. Some of these were reviews of previous decisions or resolution of long standing problems.

Spurious valve operation from hot shorts and the lessons learned from our resolution of this issue will be discussed in engineering continuing training and will be included in site initial training for new engineers.

No further actions are required since the vulnerability of SSD MOV's to the adverse affects of fire induced hot shorts on SSD have been eliminated.

DATE WHEN FULL COMPLIANCE WILL BE MET

Quad Cities is currently in full compliance.

**ATTACHMENT B (Page 1 of 2)
ESK-96-224**

**Response to An Apparent Violation in Inspection Report Nos. 50-237/96012(DRS);
50-249/96012(DRS);50-254/96016(DRS);50-265/96016(DRS)
For Dresden Station**

RESTATEMENT OF APPARENT VIOLATION

The failure to provide adequate protection to ensure operation of equipment necessary to achieve and maintain hot shutdown is considered an apparent violation of 10CFR50, Appendix R, III.G.2 and III.G.3.

REASON FOR APPARENT VIOLATION

Dresden Station accepts the violation. The design basis hot short condition was defined and evaluated in the Dresden Safe Shutdown Analysis (SSA). The consequences of a valve failure due to a fire was limited to the valve mispositioning to an undesired position (e.g., the valve fails in the open or closed position). The Dresden SSA was approved in January 1983.

CORRECTIVE ACTION TAKEN AND RESULTS ACHIEVED

Dresden Station installed modifications to ensure that the hot short would not effect the Isolation Condenser. Additionally, Dresden Station revised SSD procedures to ensure that if a hot short occurred in the Reactor Water Cleanup System, a non-motor operated valve was closed to ensure isolation. Full compliance is achieved.

ACTIONS TO PREVENT FURTHER OCCURRENCE

No further actions are required since the vulnerability of SSD MOV's to the adverse affects of fire induced hot shorts on SSD have been eliminated.

DATE WHEN FULL COMPLIANCE WILL BE MET

Dresden is currently in full compliance.

**ATTACHMENT B (Page 2 of 2)
ESK-96-224**

**Response to An Apparent Violation in Inspection Report Nos. 50-237/96012(DRS);
50-249/96012(DRS);50-254/96016(DRS);50-265/96016(DRS)
For Dresden Station**

REPORTABILITY

The Referenced Inspection Report requested ComEd to discuss the basis for Dresden's decision to not report the hot short issue once it was identified as a valid technical concern. Dresden did not report the condition because the concern was not considered safety significant due to the low probability of the event, the low number of valves requiring modification (three per unit), and the provisions of redundant safe shutdown systems in the event of a fire in the control room (e.g., High Pressure Coolant Injection (HPCI) and the Isolation Condenser).

ATTACHMENT C (Page 1 of 3)
ESK-96-224

Response to the Request for Additional Information
Inspection Report Numbers 50-237/96012(DRS);
50-249/96012(DRS); 50-254/96016(DRS); 50-265/96016(DRS)

RESOURCE ALLOCATION

The consequences of a valve spuriously actuating due to fire was limited to the functional failure state of a valve mispositioning to an undesired position and failing in that position. The Dresden SSA was approved in January 1983. The Quad Cities SSA was approved in December 1982. Valve damage resulting from hot shorts was not considered.

In 1992, IEN 92-18 was issued to inform licensees of the potential for mechanical valve damage resulting from fire induced hot shorts. ComEd concluded that the impact was minimal due to the low probability of a control room fire and valve damage from fire induced hot shorts.

In June 1996, as a result of increased corporate oversight, ComEd recognized that its past actions with respect to this issue did not address the consequences of spurious valve actuation and potential valve damage caused by a postulated "hot short". Specifically, ComEd revisited the concerns outlined in IEN 92-18 and recognized that thermal overload protection would not preclude mechanical damage for all motor operated valve control circuits. IEN 92-18 alerted licensees that under certain conditions, a postulated control room fire could result in a loss of capability to maintain the reactor in a safe shutdown condition. Assuming the postulated event occurs (i.e., a design basis fire with a hot short that leads to mechanical valve damage), safe shutdown may not be assured. As a result, all six (6) sites were directed to re-evaluate their original IEN 92-18 response.

In July 1996, after each site reviewed their original IEN 92-18 responses, ComEd Engineering classified the concern as a technical issue requiring resolution. Corporate fire protection worked with site engineers to develop a generic action plan for resolving the issue. Site specific action plans were then developed and implemented. As a result, the issue of a fire induced "hot short" resulting in spurious actuation with valve damage was aggressively pursued, and conservative actions were implemented. For Dresden and Quad Cities, this action included control circuit modifications to certain motor operated valves which are critical for assuring safe shutdown capability. These modifications were completed prior to returning the units to service.

ComEd now has addressed the merits of the technical issue and taken action prior to startup of both the Dresden and Quad Cities Stations. Prior to 1996, ComEd historically took the position that for Appendix R compliance, the consequences of a valve spuriously operating due to fire was limited to the valve mispositioning to an undesired position (e.g., valve fails opened or closed) and that the probability for valve mechanical damage was sufficiently low. This does not impact our decision in recent months to address and resolve the technical issue.

ATTACHMENT C (Page 2 of 3)
ESK-96-224

Response to the Request for Additional Information
Inspection Report Numbers 50-237/96012(DRS);
50-249/96012(DRS); 50-254/96016(DRS); 50-265/96016(DRS)

MITIGATION FACTORS

A. Self-Identification

ComEd self-identified and resolved the technical issue related to hot shorts prior to returning the Dresden and Quad Cities units to service. This specific technical issue was not considered during initial design.

The failure to modify the motor operated valve circuits in a more timely manner was a result of a lack of sensitivity to the specific hot short technical concern now at issue. Since that time, ComEd Corporate Engineering has instituted oversight and assessment policies to increase the sensitivity to fire protection issues which led to the re-evaluation IEN 92-18.

B. Conservative Recommendations

This issue is an example of how the corporate engineering staff and the site engineering staffs are working together. It is this cooperation between organizations that identified the issue and initiated the recent consistent conservative review of the issue of hot shorts at all of the ComEd stations.

C. Safety Significance

Safe Shutdown in the unlikely event of a design basis fire occurring at Dresden is assured by a defense in depth approach to fire protection, including administrative controls and procedures to prevent fires, rapid detection and suppression systems, and containment of fires that spread unsuppressed for an extended period of time. However, in the unlikely event of a design basis fire, the hot short issue has the potential to pose a safety concern. For this reason corrective actions, including design changes to ensure systems important to safe shutdown will remain available during a postulated design basis fire event, were taken.

Safe Shutdown in the unlikely event of a design basis fire occurring at Quad Cities is assured by a defense in depth approach to fire protection, including administrative controls and procedures to prevent fires, rapid detection and suppression systems, and containment of fires that spread unsuppressed for an extended period of time. However, in the unlikely event of a design basis fire, the hot short issue is a safety concern. Prior to these design changes, in the absence of operator mitigating actions, a design basis fire could have resulted in mechanical valve damage such that SSD could not be achieved as written in the SSD procedures.

ATTACHMENT C (Page 3 of 3)
ESK-96-224

Response to the Request for Additional Information
Inspection Report Numbers 50-237/96012(DRS);
50-249/96012(DRS); 50-254/96016(DRS); 50-265/96016(DRS)

Although ComEd believes that the overall safety significance was low due to the low probability for a hot short condition leading to mechanical damage, ComEd has taken corrective action based on the consequences of such a failure.

CONCLUSION

ComEd acknowledges that the concern involves a valid technical issue, and has conservatively acted to resolve the issue.