U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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License Nos:	DPR-19; DPR-25; DPR-29; DPR-30
Report Nos:	50-237/96012(DRS); 50-249/96012(DRS); 50-254/96016(DRS); 50-265/96016(DRS)
Licensee:	Commonwealth Edison Company
Facility:	Dresden Nuclear Station Units 2 and 3 Quad Cities Nuclear Station Units 1 and 2
Location:	6500 N. Dresden Road Morris, IL 60450 22712 206th Avenue North Cordova, IL 61242
Dates:	July 8 through October 17, 1996
Inspector:	D. S. Butler, Reactor Inspector
Approved By:	R. N. Gardner, Chief, Engineering Specialists 2 Division of Reactor Safety

EXECUTIVE SUMMARY

Dresden Nuclear Station Units 2 and 3
NRC Inspection Report Nos. 50-237/96012(DRS); 50-249/96012(DRS)
Quad Cities Nuclear Station Units 1 and 2
NRC Inspection Report Nos. 50-254/96016(DRS); 50-265/96016(DRS)

This regional inspection reviewed the licensee's efforts to address Appendix R hot short vulnerabilities (Dresden and Quad Cities), 4KV breaker hardened grease concerns and the status of previously identified electrical distribution system functional inspection (EDSFI) items (Dresden). The following weaknesses were identified:

Engineering

- Inadequate review of NRC and industry initiatives contributed to safe shutdown vulnerabilities (Dresden and Quad Cities) and contributed to 4KV breaker hardened grease concerns (Dresden).

- A more thorough OPEX program review of industry initiatives may have identified the hardened grease issue before Dresden's 3A LPCI pump breaker failed.

- Dresden's actions to address cable ampacity concerns have been slow in resolving this issue.

Report Details

III. Engineering

E1 Engineering Support of Facilities and Equipment

E1.1 Engineering Review of NRC and Industry Initiatives

a. Inspection Scope (37551)

The inspector reviewed the circumstances surrounding a potential condition outside the facility's Appendix R design basis and the corrective actions taken by the licensee to prevent hardened grease buildup in 4KV circuit breakers.

b. Observations and Findings

(1) Potential for Loss of Shutdown Capability During A Control Room Fire (Dresden and Quad Cities)

(a) Background

In the mid-1980s, the licensee identified the potential for hot shorts to affect motor operated valves (MOVs) during postulated plant fires. The Stations assumed these valves would be available for manual realignment following control room evacuation. Provisions were made in the safe shutdown procedures to open individual MOV circuit breakers in preparation for manual operation of the valves.

On February 28, 1992, the NRC issued IN 92-18. This IN described the potential for loss of remote shutdown capability during a control room fire. This fire could cause hot shorts, such as short circuits between motor operated valve (MOV) control circuit conductors and their control power source that initiate spurious operation of certain MOVs before the operators shift control of the valves to the remote/alternate shutdown panel. (Dresden and Quad Cities do not have remote/alternate shutdown panels, but rely on the opening of individual valve circuit breakers to remove electrical power.) Motor thermal overload (TOL) protection may be bypassed, set high or set with a longer tripping time to allow for additional valve duty cycles and/or reversing of the MOV during stroking. The IN identified that MOV torque and limit switches would not electrically disconnect a stroking valve due to the hot short bypassing the limit and torque switches. This had the potential to cause mechanical damage to the valve and/or damage the motor.

The IN was tracked in Dresden's Nuclear Tracking System (NTS) by item No. 237-103-92-01801 and had an Item Date of February 28,

1992. The NTS item indicated that a preliminary hot short assessment of Dresden and Quad Cities did not show an unanalyzed condition existed.

On August 13, 1992, the Nuclear Management and Resources Council (NUMARC) issued a letter to NUMARC administrative points of contacts regarding IN 92-18. The letter stated, "We suggest careful consideration by utility management of any plans regarding plant design changes in response to IN 92-18." This included a suggestion that the potential costs involved in making any design modifications to prevent the adverse effects of the hypothetical hot shorts, may be large compared with the risk significance.

Per an October 1, 1992, letter, the licensee determined that IN 92-18 was applicable to all ComEd Stations and suggested that the Nuclear Engineering Department (NED) conduct an in-depth review of the Safe Shutdown Analyses (SSAs).

On July 6, 1993, Sargent and Lundy (S&L) letter No. D-0686M identified to Dresden that three valves per Unit could be affected by the IN control room fire hot short scenario. S&L recommended rewiring the MOVs or resizing thermal overload (TOL) heaters to de-energize the valve contactors and stop valve movement before the valve assembly was physically damaged. No action was taken by the licensee.

On August 31, 1993, S&L letter No. Q-0745M identified to Quad Cities that about 30 valves per Unit could be affected by a control room fire. S&L recommended rewiring the MOVs or resizing thermal overload (TOL) heaters to de-energize the valve contactor and stop valve movement before the valve assembly was physically damaged. However, this S&L letter referenced the NUMARC letter and stated, "Before taking any action concerning this review, please review the enclosed NUMARC letter dated August 13, 1993." No action was taken by the licensee.

On March 28, 1994, Quad Cities site engineering evaluated (Chron # 0300239) IN 92-18. Support engineering determined that hot shorts did not pose a concern at Quad Cities based on the following:

- Quad Cities MOVs had TOL protection. The TOLs were sized to trip on excessive locked rotor current and prevent damage to the valve.

- MOV circuits were wired in various configurations such that a hot short may or may not bypass an MOV limit and/or torque switch. The probability of a hot short over-torquing a valve was considered low.

- The majority of the motor control circuits were wired as a floating (ungrounded) circuit. Therefore, a hot short of an MOV control conductor to an independent power source would not cause valve actuation for a control room fire. If the valve control circuit were grounded, then the above two considerations would protect the MOV.

- Safe shutdown procedures were designed to de-energize the power source to affected valves and sequentially close required equipment breakers as needed. Thus, "the QARP procedures affectively render the affects of Smart Hot Shorts originating from the Control Room void."

Per a December 22, 1994, letter, the licensee's probability risk assessment (PRA) group recommended that the valve control circuit design not be modified at Dresden and Quad Cities due to low probability of the hot short event.

In 1996, both Dresden (December 1995) and Quad Cities had initiated their biannual fire protection update. The Fire Protection Report (FPR) and Fire Protection Program Documentation Package (FPPDP) were updated during this review. This included the Appendix R Safe Shutdown Analysis and Fire Hazard Analysis Report. By May 1996, Quad Cities was informed by a fire protection contractor that TOLs may not protect a valve from mechanical damage for an IN 92-18 control room fire. The contractor had recently participated in an Appendix R review at another RIII licensed facility. Quad Cities notified Dresden and both Stations re-reviewed IN 92-18 and concluded they were susceptible to hot short induced valve mechanical damage.

(b) Discussion

Both Dresden and Quad Cities designs used TOLs to protect MOV motors. However, in some instances, the TOL tripping time had been increased to meet NRC Generic Letter No. 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," requirements. The licensees initiated weak-link reviews and concluded that certain MOVs may be mechanically damaged before the motor's TOL tripped. This could prevent an operator from repositioning valves that experienced spurious operation due to a hot short. Dresden identified three valves per Unit that required modification. One valve (MO 2(3)-1301-3, Isolation Condenser RX Inlet Isolation Valve), per Unit was modified. The remaining two isolation valves (MO 2(3)-1201-2 and -3) did not create a hot short concern since procedure steps already existed that isolated reactor water cleanup (RWCU) utilizing other valves. Approximately 30 Quad Cities valves per Unit were modified by electrically placing the torque and limit switches between the areas

where potential hot shorts could occur and each valve's open and closed contactor. The modifications did not change the electrical operation of the valves. The difference in numbers of valves per Station was due to Dresden having an isolation condenser. The inspector reviewed several design packages from both Stations and concluded that the changes would alleviate the concern identified in the IN. All affected Appendix R valves have been modified at both Stations.

Although the licensee corrected the hot short concern once identified, engineering's initial IN 92-18 review was inadequate. Engineering had concluded the probability was low for Dresden and Quad Cities to have a hot short concern and recommended no corrective actions.

(c) Safety Significance

This issue has safety significance in that spurious operation induced mechanical damage to 10 CFR 50, Appendix R, designated valves could result in the loss of safe shutdown capability during a control room fire. Both Stations' safe shutdown procedures required manual manipulation of these Appendix R valves following electrical isolation.

Both Stations had multiple opportunities to identify the hot short concern. The failure to provide adequate protection to ensure operation of equipment necessary to achieve and maintain hot shutdown is considered an apparent violation (50-237/96012-01(DRS); 50-249/96012-01(DRS); 50-254/96016-01(DRS); 50-265/96016-01(DRS)) of 10 CFR 50, Appendix R, III.G.2 and III.G.3. This closes Unresolved Item 50-254/96008-11(DRS); 50-265/96008-11(DRS). This condition had existed since the mid-1980s.

(2) Hardened Grease in 4KV Magne-Blast Circuit Breakers (Dresden Only)

(a) Background

During the 1989 NRC maintenance team inspection, the NRC identified a corrective action violation (50-237/88029-02(DRS); 50-249/88030-02(DRS)) concerning a sticking 2D low pressure coolant injection (LPCI) pump 4KV breaker trip latch roller mechanism. The violation was issued to the licensee on April 4, 1989. The maintenance team identified that the root cause for the breaker failure was a lack of preventive maintenance. As part of the licensee's corrective actions, a review was initiated of 4KV maintenance procedures, surveillances, breaker manuals and updates to the manuals at all ComEd facilities.

On July 7, 1995, General Electric (GE) issued Service Advisory Letter (SAL) No. 352.1, which summarized past vendor correspondence and design updates for GE Magne-Blast breakers and cubicles.

On August 25, 1995, GE issued SAL No. 354.1, which delineated GE's recommendations for breaker lubrication practices and preventive maintenance frequencies.

On January 18, 1996, the licensee identified an adverse trend in the performance of horizontal lift 4KV breakers. An interdisciplinary team was assembled to investigate the trend.

During the February 14 through March 29, 1996, NRC inspection period (NRC Inspection Report Nos. 50-237/96002; 50-249/96002), the NRC reviewed past 4KV breaker maintenance history records and concluded the licensee had inadequately resolved previously identified 4KV breaker problems. A corrective action violation (50-237/96002-06A; 50-249/96002-06A) was issued to the licensee on May 20, 1996.

On June 11, 1996, the 3A LPCI pump breaker did not trip open during routine surveillance testing. The licensee began an extensive review of the breaker failure. Four spare breakers were inspected. Two of the four spare breakers inspected exhibited hardened grease symptoms. However, they both operationally tripped at a rated undervoltage of 70 volts.

On June 19, 1996, the licensee responded to corrective action violation 50-237/96002-06A; 50-249/96002-06A. In addition, the licensee's interdisciplinary team concluded that past ineffective corrective actions and the lack of technical documentation had contributed to inadequate breaker preventive maintenance. Management conservatively concluded that Unit 3 should be shut down to perform corrective maintenance on the 4KV breakers. Unit 2 was already shut down due to unrelated problems.

On June 20, 1996, the licensee formed an event response team. The team was chartered to establish the root cause, verify current breaker technical information, resolve discrepant conditions found during testing, recommend appropriate corrective actions, track as-found conditions in the breakers and recommend retests to assure reliable operation.

On July 17, 1996, the licensee amended their response to violation 50-237/96002-06A; 50-249/96002-06A. In part, the licensee's response indicated that the adverse 4KV breaker trend dealt exclusively with breaker and cubicle alignment problems associated with racking the breakers in and out. The identified failures were

attributed to electrical switches and associated linkages that connect the breaker to the breaker cubicle and not the internal breaker mechanical sections.

(b) Discussion

The inspector reviewed the licensee's root cause investigation report, dated August 29, 1996, "4KV Breakers - Hardened Grease in Trip Latch Roller Bearings." The hardened grease issue was previously discussed in NRC Inspection Report Nos. 50-237/96006; 50-249/96006.

On June 11, 1996, the 3A LPCI pump breaker did not trip open during routine surveillance testing. The breaker tripped after the main control room switch was placed in pull-to-lock for about ten seconds. The breaker type was a General Electric (GE) magne-blast horizontal-lift, model AMH-4.76-250-OD. Licensee investigation identified that hardened grease on the trip latch roller bearing caused the trip mechanism to be unreliable. The increased frictional forces between the trip latch and the trip latch roller could not be overcome by the trip coil. Two of four spare breakers inspected also had symptoms of hardened grease. The licensee with GE assistance prepared and implemented a comprehensive 4KV breaker inspection, maintenance and test plan. Cubicles, linkages, auxiliary switches and breakers were examined and refurbished as required. All inservice 4KV safety related breakers were overhauled. In addition, tests were performed on several spare breakers obtained from Quad Cities. This included grease analysis and maintenance practice reviews. The first noted difference between the two Stations was that Dresden used a volatile degreaser applied from an aerosol can, where Quad Cities only used denatured alcohol when cleaning breaker parts. The second noted difference was in the maintenance procedure steps. Following cleaning, Quad Cities applied a light film of SAE 10 weight turbine oil while Dresden applied a light film of grease followed by a light film of SAE 20 to 30 weight oil. Analysis of Dresden's grease identified that the use of volatile degreasers "washed away" lighter lubrication components of the original "white" grease, leaving a thicker, stiffer grease. In addition, by applying the grease first, Dresden kept the oil from permeating the bearing and refreshing the grease. In actuality, Dresden was over-greasing and accelerating the grease hardening process. The root cause analysis also concluded that Dresden had used low quality penetrating oils during troubleshooting and maintenance. These oils appeared to have a short term benefit by freeing up sticking mechanical mechanisms. However, in the long term they were not refreshing the grease, since lightweight, volatile components of the penetrating oils evaporated over time. The uncontrolled use of different chemicals at Dresden may have caused a grease compatibility problem and accelerated the hardening of the

grease. General Electric indicated in 1984 that low quality penetrating oils should not be used to revitalize grease and retracted their recommendation to use penetrating oils to refresh greases used in 480 volt AK-25 breakers. The Quad Cities grease analysis identified that their lubricating practices had refreshed the grease, slowed oxidation of the grease, and ensured the grease still had lubricating properties. The investigation team concluded that hardened grease caused the 3A LPCI pump breaker failure.

In addition, the licensee's team identified two concerns associated with the Operational Experience Report (OPEX) program. This program was used to review NRC Information Notices, Bulletins, Generic Letters and industry information. The licensee's team identified that GE SALs related to the 4KV breakers had been inadequately controlled. Although the SALs did not directly identify a hardened grease issue, a thorough review of the SALs may have led to the identification of the hardened grease issue before the 3A LPCI pump breaker failed. The second concern identified a recurring theme that breaker failures had been caused by inadequate lubrication.

(c) Safety Significance

During a design basis accident (DBA) concurrent with a loss of offsite power (LOOP), the failure of the LPCI motor (if already running) breaker to trip open had the potential to load the pump on the emergency diesel generator (EDG) out of sequence. The LPCI pump would restart when the EDG output breaker closed along with 480 volt auxiliary loads. This had minimal safety significance, since the EDG load at breaker closure would be less than the load when the core spray pump started with two LPCI pumps already running. Starting the LPCI pump early would not affect the safety analysis, since the pump would be operating on recirculation flow, which is the normal flow produced by the pump until reactor pressure decreases low enough to inject. The inspector reviewed portions of calculation No. 9389-46-19-3, Revision 0, "Diesel Generator 2/3 Loading Under Design Bases Accident Conditions." The MP45 Dead Load Pickup Capability lock rotor curve for Dresden's EDGs indicated that the voltage would recover to about 95% in less than one second during the starting of the LPCI pump and auxiliary loads. This would provide sufficient voltage to all starting loads and not affect continued EDG loading.

Dresden had multiple opportunities to identify deficient 4KV breaker maintenance. The inspector concluded that maintenance procedure DES 6700-03, Revision 7, "Inspection and Maintenance of General Electric 4KV Magne-Blast Circuit Breakers Types AM-4.76-250-OD (Horizontal Drawout)," was inadequate. The procedure approved the use of the degreaser and a sequence of procedure lubrication steps

that contributed to the hardened grease issue. In addition, various unapproved chemicals were used when performing breaker maintenance. This is considered a violation (50-237/96012-02(DRS); 50-249/96012-02(DRS)) of 10 CFR 50, Appendix B, Criterion V. This closes Unresolved Item 50-237/96006-05;50-249/96006-05. Also, a more thorough OPEX program review of industry initiatives may have identified the hardened grease issue sooner and prevented the 3A LPCI pump breaker failure.

c. Conclusion

The inspector concluded that engineering had performed inadequate reviews of the original Appendix R hot short design requirements, and weak reviews of NRC and industry initiatives for both of the above concerns. However, once the identified concerns were fully understood by the licensee, the Stations aggressively resolved the concerns and made conservative engineering and maintenance decisions.

E1.2 Resolution of Old (Original) Design Issues (Dresden Only)

a. Inspection Scope (37551)

Regional NRC inspectors had reviewed and closed all of the 1991 EDSFI items based on commitments made by the licensee. The following details describe the EDSFI items that are open in the licensee's tracking system.

b. Observations and Findings

(1) 4KV Breaker Overduty

Dresden's Updated Final Safety Analysis Report stated in Section 8.3.1, "AC Power Systems," that all protective circuit breakers were sized to interrupt the maximum available line-to-line or three phase short circuit current. The EDSFI team identified that certain 250MVA and 350MVA switchgear breakers could be subjected to fault currents that exceeded their maximum interrupting and momentary ratings.

In response, the licensee strengthened the bus bracing in the nonsafety 350MVA switchgear cubicles and upgraded safety related 250MVA breakers to 350MVA SF6 breakers. However, the 350MVA switchgear analysis identified that an overduty condition could still occur if two reactor feedwater pumps and two reactor recirculation pump motor-generator (MG) sets were fed from the same transformer. The licensee refined the short circuit analysis and concluded that the available fault current was within the original design breaker ratings. However, the breaker manufacturer indicated that they had decreased the nonsafety 350MVA breaker ratings.

During normal plant operation, a recirculation pump MG set and one motor-driven feedwater pump were fed from one transformer. The other

recirculation pump and motor-driven feedwater pump were fed from a second transformer. A third non-running motor-driven feedwater pump was maintained in standby and would only be used if one of the running feedwater pumps tripped. In this alignment, the nonsafety 350MVA breakers could safely interrupt a three phase fault at the bus. The licensee concluded that the probably of a bus fault was low. In addition, a nonsafety 4KV motor load would only be added to the other transformer if it's own transformer feed was lost. The loss of a second transformer feed would place a Unit in a seven day Technical Specification (TS) limiting condition of operation (LCO) and initiate actions to restore the normal alignment. The overduty issue was not a concern during a design basis accident, since the recirculation pump MG sets would be automatically tripped.

The inspector reviewed the above information and concluded that the nonsafety 350MVA breaker overduty issue had minimal safety impact.

(2) Balance of Plant Electrical Load Monitoring System (ELMS)

The licensee developed a program to gather electrical voltage and current data for transformers, motors and other loads during various operating conditions. The collection of load flow data should be completed in 1997. Additional monitoring equipment was being purchased and installed. Because of EDSFI degraded voltage concerns, the licensee had developed a program to obtain similar information for safety related loads. This data was used to support degraded voltage setpoint calculations. Completing the collection of balance of plant load flow data should give the licensee a representative model of actual plant electrical and current requirements. The inspector had no further questions at this time.

(3) 480Vac Breaker Coordination

The EDSFI team identified that full electrical coordination did not exist from several load breakers to their upstream feed breaker. This was considered a design weakness by the EDSFI team; however, this design was consistent with the original design basis.

In response, the licensee acknowledged that better coordination was desirable. The licensee has replaced the original design EC-2 electro-mechanical trip devices with solid-state RMS-9 Micro Versa Trip devices. However, six breakers per Unit were in a harsh environment zone. To date, the licensee has not been successful in environmentally qualifying (EQ) the RMS-9 trip device. The licensee was continuing their efforts to obtain an environmentally qualified device. In both Units, the licensee has installed new EC-2 devices in the six EQ breakers. The licensee determined that full coordination existed except when divisional buses were crosstied. However, the paralleling of redundant buses was not permitted during power operation. The crosstie breakers were administratively controlled open. The inspector

concluded the licensee had addressed 480Vac breaker coordination in an acceptable manner.

(4) Adequacy of Cable Ampacity

The licensee was unable to provide the EDSFI team documentation to establish that cables were properly sized.

In response, the licensee committed to evaluate cable ampacity concerns. The Sargent and Lundy Interactive Cable Engineering (SLICE) program was used to identify overloaded cables. Field temperature and current measurements were taken to determine a conservative means of qualifying geometric and system diversity. The licensee indicated that about 350 cables required additional analyses. This program was tentatively scheduled for completion by the end of 1996.

This is considered an Unresolved Item (50-237/96012-03(DRS); 50-249/96012-03(DRS)) pending NRC followup on the licensee's corrective actions, and review of the operability determinations for safety related cables with ampacity concerns. Resolution of this previously identified concern has been ongoing since 1991.

(5) DC System Coordination

The EDSFI team considered the lack of 125 and 250Vdc molded case to molded case circuit breaker coordination to be a design weakness. However, licensee reviews of original design and licensing documents did not identify any requirements or commitments to establish full coordination. The lack of full coordination was due to molded case circuit breakers connected in series. Selective coordination was achieved in the overcurrent (thermal) region, but coordination in the instantaneous (magnetic) region was difficult. Miscoordination in the instantaneous region occurred for faults at the bus. Cable faults would have to occur close to the breaker output terminals, since additional cable length would limit the fault current and may coordinate with the bus feed breaker. The inspector discussed this issue with the Office of Nuclear Reactor Regulation (NRR) electrical branch. NRR indicated that molded case circuit breaker coordination was difficult to establish in the instantaneous range. In addition, NRR indicated that the probability of a fault occurring at the bus or in the cable was low. The most probable fault would occur at the load.

The inspector was concerned that nonsafety loads supplied by safety related DC buses could fail during a design basis accident, and without full electrical coordination, cause safety related functions to be lost. The licensee initiated a calculation to determine if nonsafety loads had sufficient cable length to limit the fault current at the load. Calculation results indicated that several nonsafety motor loads would not fully coordinate with the bus feed breaker for a load fault. The licensee re-emphasized to the inspector that this was

part of their original design. This is considered an Unresolved Item (50-237/96012-04(DRS); 50-249/96012-04(DRS)) for NRR to review safety related 125 and 250Vdc molded case circuit breaker coordination at Dresden. The licensee is not required to respond to this item at this time.

(6) Overcurrent Protection of Unit Substation Transformers

The EDSFI team noted that overcurrent relays did not fully protect 480 volt substation transformers for a secondary fault. However, reviews of original design and licensing documents did not identify any requirements or commitments by the licensee to establish full coordination. The team viewed this design weakness as a personnel safety issue.

In response, the licensee indicated that various design changes were being reviewed. Options included the installation of additional protective relays or replacing the transformers. The review determined that the above changes were not cost effective. The licensee indicated that full coordination would be considered if transformer replacement was deemed necessary. The inspector had no further questions at this time.

c. Conclusion

The inspector concluded that the on-site electrical engineering group was pursuing engineering solutions to old (original) design issues. However, engineering's resolution of cable ampacity concerns has not been completed. Although tentatively scheduled for completion in 1996, the cable ampacity concern has existed since 1991.

II. Management Meetings

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on October 17, 1996. The licensee acknowledged the findings presented.

The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

S. Perry, Site Vice President
M. Heffley, Units 2 and 3 Station Manager
T. O'Connor, Operations Manager
R. Kundalkar, Site Engineering Manager
R. Holbrook, Training Manager
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NRC

C. Vanderniet, Senior Resident Inspector
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INSPECTION PROCEDURE USED

IP 37551: On-Site Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-237/96012-01(DRS); 50-249/96012-01(DRS); 50-254/96016-01(DRS); 50-265/96016-01(DRS)	VIO	Inadequate safe shutdown, hot short design review (IN 92-18)
50-237/96012-02(DRS); 50-249/96012-02(DRS)	VIO	Inadequate 4KV breaker maintenance procedure
50-237/96012-03(DRS); 50-249/96012-03(DRS)	URI	Adequacy of cable ampacity
50-237/96012-04(DRS); 50-249/96012-04(DRS)	URI	Adequacy of the 125 and 250Vdc systems electrical coordination

Closed

50-237/96006-05(DRP); 50-249/96006-05(DRP)	URI	4KV breaker failure to trip
50-254/96008-11(DRS); 50-265/96008-11(DRS)	URI	Electrical hot shorts (IN 92-18)

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
DBA	Design Basis Accident
DES	Dresden Electrical Surveillance
EDG	Emergency Diesel Generator
EDSFI	Electrical Distribution System Functional Inspection
GE	General Electric
ELMS	Electrical Load Monitoring System
EQ	Environmental Qualification
FPPDP	Fire Protection Program Documentation Package
FPR	Fire Protection Report
IFI	Inspector Followup Item
IN	Information Notice
KV	Kilovolts
LCO	Limiting Condition of Operation
LOOP	Loss of Offsite Power
LPCI	Low Pressure Coolant Injection
MOV	Motor Operated Valve
MVA	Million Volt-Amperes
NED	Nuclear Engineering Department
NOV	Notice of Violation
NRR	Office of Nuclear Reactor Regulation
NTS	Nuclear Tracking System
NUMARC	Nuclear Management and Resources Council (NEI)
OPEX	Operational Experience Report Program
PRA	Probability Risk Assessment
QARP	Quad Cities Alarm Response Procedure
RX	Reactor
RWCU	Reactor Water Cleanup
SAL	Service Advisory Letter
SAE	Society of Automotive Engineers
S&L	Sargent & Lundy
SLICE	Sargent & Lundy Interactive Cable Engineering
SSA	Safe Shutdown Analyses
TOL	Thermal Overload
TS	Technical Specification
TSUP	Technical Specification Upgrade Program
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
Vac	Volts alternating-current
Vdc	Volts direct-current
VIO	Violation