December 4, 2003

Mr. J. L. Skolds, President
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INSPECTION REPORT 05000254/2003012; 05000265/2003012(DRS)

Dear Mr. Skolds:

On October 24, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on October 24, 2003, with Mr. Tulon and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and to compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Julio F. Lara, Chief
Electrical Engineering Branch
Division of Reactor Safety

Docket Nos. 50-254; 50-265
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 05000254/2003012;
05000265/2003012(DRS)

See Attached Distribution

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cc w/encl: Site Vice President - Quad Cities Nuclear Power Station
Quad Cities Nuclear Power Station Plant Manager
Regulatory Assurance Manager - Quad Cities
Chief Operating Officer
Senior Vice President - Nuclear Services
Senior Vice President - Mid-West Regional
Operating Group
Vice President - Mid-West Operations Support
Vice President - Licensing and Regulatory Affairs
Director Licensing - Mid-West Regional
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Chairman, Illinois Commerce Commission
D. Tubbs, Manager of Nuclear
MidAmerican Energy Company

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Quad Cities Nuclear Power Station Plant Manager
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U.S. NUCLEAR REGULATORY COMMISSION
REGION III

Docket Nos:	50-254; 50-265
License Nos:	DPR-29; DPR-30
Report No:	05000254/2003012; 05000265/2003012
Licensee:	Exelon Generation Company, LLC
Facility:	Quad Cities Nuclear Power Station, Units 1 and 2
Location:	22710 206th Avenue North Cordova, IL 61242
Dates:	October 6 through October 24, 2003
Inspectors:	R. Langstaff, Senior Reactor Inspector, lead R. Echoles, Nuclear Safety Intern G. Hausman, Senior Reactor Inspector
Observer:	J. Dreisbach, Nuclear Safety Intern
Approved By:	Julio F. Lara, Chief Electrical Engineering Branch Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000254/2003012; 05000265/2003012; 10/06/2003-10/24/2003; Quad Cities Nuclear Power Station, Units 1 and 2; Routine Triennial Fire Protection.

This report covers an announced baseline triennial fire protection inspection. The inspection was conducted by Region III inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after U.S. Nuclear Regulatory Commision (NRC) management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealed Findings

Cornerstones: Initiating Events and Mitigating Systems

No findings of significance were identified.

B. Licensee-Identified Violations

No findings of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05)

The purpose of this inspection was to review the Quad Cities Nuclear Power Plant fire protection program for a selected risk-significant fire area. Emphasis was placed on verifying that the post-fire safe shutdown capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire safe shutdown success path was available. The inspection was performed in accordance with the U.S. Nuclear Regulatory Commission (NRC) regulatory oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The lead inspector used the Quad Cities Nuclear Power Plant Individual Plant Examination for External Events to choose several risk-significant areas for detailed inspection and review. Fire Area TB-III, Unit 1 Turbine Building, Southern Zone Group was reviewed for this inspection. The inspectors focused their review on the following fire zones:

Fire Zone	Description of Fire Zone Reviewed
8.2.6.A	Unit 1 Turbine Building Ground Floor
8.2.7.A	Unit 1 Turbine Building Mezzanine Floor
9.1	Unit 1 Emergency Diesel Generator Room

The primary focus for this inspection was on the safe shutdown procedures and safe shutdown methodology for the selected fire area and zones. The determination of license commitments and changes to the fire protection program were reviewed for the selected fire area and zones.

.1 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

Title 10 CFR Part 50, Appendix R, Section III.G.1, required the licensee to provide fire protection features that were capable of limiting fire damage to structures, systems, and components important to safe shutdown. The structures, systems, and components that were necessary to achieve and maintain post-fire safe shutdown were required to be protected by fire protection features that were capable of limiting fire damage to the structures, systems, and components so that:

- One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) was free of fire damage; and
- Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) could be repaired within 72 hours.

Specific design features for ensuring this capability were specified by 10 CFR Part 50, Appendix R, Section III.G.2.

a. Inspection Scope

The inspectors reviewed the plant systems required to achieve and maintain post-fire safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for each fire zone selected for review. Specifically, the review was performed to determine the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and support system functions. This review included the fire protection safe shutdown analysis.

The inspectors also reviewed the operators' ability to perform the necessary manual actions for achieving safe shutdown including a review of procedures, accessibility of safe shutdown equipment, and the available time for performing the actions.

The inspectors reviewed the updated final safety analysis report and the licensee's engineering and/or licensing justifications (e.g., NRC guidance documents, license amendments, technical specifications, safety evaluation reports, exemptions, and deviations) to determine the licensing basis.

b. Findings

No findings of significance were identified.

.2 Fire Protection of Safe Shutdown Capability

Title 10 CFR Part 50, Appendix R, Section III.G.2, required separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. If the requirements cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided (Section III. G.3).

a. Inspection Scope

For the selected fire area, the inspectors reviewed the licensee's safe shutdown analysis to ensure that at least one post-fire safe shutdown success path was available in the event of a fire. This included a review of manual actions required to achieve and maintain hot shutdown conditions and make the necessary repairs to reach cold shutdown within 72 hours. The inspectors also reviewed procedures to verify that adequate direction was provided to operators to perform these manual actions. Factors, such as timing, access to the equipment, and the availability of procedures, were considered in the review.

The inspectors also evaluated the adequacy of fire suppression and detection systems, fire area barriers, penetration seals, and fire doors to ensure that at least one train of safe shutdown equipment was free of fire damage. To accomplish this, the inspectors

observed the material condition and configuration of the installed fire detection and suppression systems, fire barriers, and construction details and supporting fire tests for the installed fire barriers. In addition, the inspectors reviewed license documentation, such as deviations, detector placement drawings, fire hose station drawings, carbon dioxide pre-operational test reports, smoke removal plans, fire hazard analysis reports, safe shutdown analyses, and National Fire Protection Association codes to verify that the fire barrier installations met license commitments.

b. Findings

No findings of significance were identified.

.3 Post-Fire Safe Shutdown Circuit Analysis

Title 10 CFR Part 50, Appendix R, Section III.G.1, required that structures, systems, and components important to safe shutdown be provided with fire protection features capable of limiting fire damage to ensure that one train of systems necessary to achieve and maintain hot shutdown conditions remained free of fire damage. Options for providing this level of fire protection were delineated in 10 CFR Part 50, Appendix R, Section III.G.2. Where the protection of systems whose function was required for hot shutdown did not satisfy 10 CFR Part 50, Appendix R, Section III.G.2, an alternative or dedicated shutdown capability and its associated circuits, was required to be provided that was independent of the cables, systems, and components in the area. For such areas, 10 CFR Part 50, Appendix R, Section III.L.3, specifically required the alternative or dedicated shutdown capability to be physically and electrically independent of the specific fire areas and capable of accommodating post-fire conditions where offsite power was available and where offsite power was not available for 72 hours.

a. Inspection Scope

On a sample basis, the inspectors evaluated the adequacy of separation provided for the power and control cabling of redundant trains of shutdown equipment. This investigation focused on the cabling of selected components in systems important for safe shutdown. The inspectors' review also included a sampling of components whose inadvertent operation due to fire may adversely affect post-fire safe shutdown capability. The purpose of this review was to determine if a single exposure fire, in one of the fire areas selected for this inspection, could prevent the proper operation of both safe shutdown trains.

b. Findings

No findings of significance were identified.

.4 Alternative Safe Shutdown Capability

Title 10 CFR Part 50, Appendix R, Section III.G.1, required that structures, systems, and components important to safe shutdown be provided with fire protection features capable of limiting fire damage to ensure that one train of systems necessary to achieve

and maintain hot shutdown conditions remained free of fire damage. Options for providing this level of fire protection were delineated in 10 CFR Part 50, Appendix R, Section III.G.2. Where the protection of systems whose function was required for hot shutdown did not satisfy 10 CFR Part 50, Appendix R, Section III.G.2, an alternative or dedicated shutdown capability independent of the area under consideration was required to be provided. Additionally, alternative or dedicated shutdown capability must be able to achieve and maintain hot standby conditions and achieve cold shutdown conditions within 72 hours and maintain cold shutdown conditions thereafter. During the post-fire safe shutdown, the reactor coolant process variables must remain within those predicted for a loss of normal alternating current power, and the fission product boundary integrity must not be affected (i.e., no fuel clad damage, rupture of any primary coolant boundary, or rupture of the containment boundary).

a. Inspection Scope

The inspectors reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions. The inspectors also focused on the adequacy of the systems to perform reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

b. Findings

No findings of significance were identified.

.5 Operational Implementation of Alternative Shutdown Capability

Title 10 CFR Part 50, Appendix R, Section III.L.2.d, required that the process monitoring function should be capable of providing direct readings of the process variables necessary to perform and control the functions necessary to achieve reactivity control, reactor coolant makeup, and decay heat removal.

a. Inspection Scope

The inspectors interviewed operators with respect to actions described in procedures QCOA 4100-11, "Fire Alarm System Alarm/Trouble;" QCOA 0010-12, "Fire/Explosion;" and QCARP 0030-01, TB-III, "Injection with SSMP (Safe Shutdown Makeup Pump) and Bring the Unit to Cold Shutdown." The inspectors reviewed the ability of operators to perform procedure actions within applicable plant shutdown time requirements.

The inspectors' reviews of the adequacy of communications and emergency lighting associated with these procedures are documented in Sections 1R05.6 and 1R05.7 of this report.

b. Findings

No findings of significance were identified.

.6 Communications

For a fire in an alternative shutdown fire area such as the cable spreading room, control room evacuation is required and a shutdown is performed from outside the control room. Radio communications are relied upon to coordinate the shutdown of both units and for fire fighting and security operations. Title 10 CFR Part 50, Appendix R, Section III.H., required that equipment provided for the fire brigade include emergency communications equipment.

a. Inspection Scope

The inspectors verified that communications equipment was available to operations personnel.

b. Findings

No findings of significance were identified.

.7 Emergency Lighting

Title 10 CFR Part 50, Appendix R, Section III.J., required that emergency lighting units with at least an eight hour battery power supply be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

a. Inspection Scope

The inspectors performed a walkdown of a sample of the safe shutdown pathways used for procedure QCARP 0030-01. As part of the walkdowns, the inspectors focused on the existence of sufficient emergency lighting for access and egress to areas and for performing necessary equipment operations.

b. Findings

No findings of significance were identified.

.8 Cold Shutdown Repairs

Title 10 CFR Part 50, Appendix R, Section III.L.5, required that equipment and systems comprising the means to achieve and maintain cold shutdown conditions should not be damaged by fire; or the fire damage to such equipment and systems should be limited so that the systems can be made operable and cold shutdown achieved within 72 hours. Materials for such repairs shall be readily available onsite and procedures shall be in effect to implement such repairs.

a. Inspection Scope

The inspectors reviewed the licensee's procedures to determine if any repairs were required to achieve cold shutdown. The inspectors determined that the licensee did

require repair of some equipment to reach cold shutdown based on the safe shutdown methods used. The inspectors reviewed the procedures for adequacy.

b. Findings

No findings of significance were identified.

.9 Fire Barriers and Fire Zone/Room Penetration Seals

Title 10 CFR Part 50, Appendix R, Section III.M., required that penetration seal designs be qualified by tests that are comparable to tests used to rate fire barriers.

a. Inspection Scope

The inspectors reviewed the test reports for three-hour rated barriers installed in the plant and performed visual inspections of selected barriers to ensure that the barrier installations were consistent with the tested configuration. In addition, the inspectors reviewed the fire loading for selected areas to ensure that existing barriers would not be challenged by a potential fire.

b. Findings

No findings of significance were identified.

.10 Fire Protection Systems, Features, and Equipment

a. Inspection Scope

The inspectors reviewed the material condition, operations lineup, operational effectiveness, and design of fire detection systems, fire suppression systems, manual fire fighting equipment, fire brigade capability, and passive fire protection features. The inspectors reviewed deviations, detector placement drawings, fire hose station drawings, carbon dioxide system pre-operational test reports, and fire hazard analysis reports to ensure that selected fire detection systems, sprinkler systems, portable fire extinguishers, and hose stations were installed in accordance with their design, and that their design was adequate given the current equipment layout and plant configuration.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that adequate compensatory measures were put in place by the licensee for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features. The inspectors

also reviewed the adequacy of short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings of significance were identified.

.12 Cable Trays

a. Inspection Scope

The inspectors performed a walkdown of the selected fire areas to assess the electrical separation of power, control, and instrumentation cables.

b. Findings - Cable Ampacity Calculations

Introduction: The inspectors identified one issue with respect to cable ampacity calculation methodology. The issue will be treated as an unresolved item pending further review of the licensee's methodology.

Description: During the inspectors' walkdown of Fire Area TB-III, the inspectors observed that the cable fill for several cable trays, located in the Unit 1 Turbine Building mezzanine area, exceeded the cable trays sidewall height by several inches. The inspectors questioned the licensee about potential overheating of the cables at cable tray points 261T, 261M1, 261M2, and 261B. In addition, the licensee was questioned as to what method was used to account for cable derating/cable tray loading and potential ampacity concerns.

The licensee compared the cable tray points in question to a cable tray thermal analysis report in the Sargent and Lundy Interactive Cable Engineering (SLICE) database. The comparison indicated that cable tray points 261T, 261M2, and 261B did not contain any power cables with ampacity concerns. However, cable tray point 261M1 contained 23 power cables with identified SLICE database ampacity concerns. Licensee engineering personnel stated that the SLICE User's Manual commented that, "many apparent overloads can be attributed to the inherent conservatism of the analysis." Based on the use of ampacity multiplying factors, generated by the calculations identified below, to the cables at cable tray point 261M1, the licensee stated that there were only three cables with ampacity concerns. The three cables identified (i.e., 11636, 11638, and 14007) required a SLICE database revision for two of the cables, as documented in Condition Report (CR) 00180384, "Cable Ampacity Input Discrepancies in SLICE Database," dated October 10, 2003, and the remaining cable (cable 14007) supplied a non-continuous load that did not have an adverse effect of cable tray ampacity loading. However, the inspectors were concerned that the calculations used to generate the ampacity multiplying factors, which modified the SLICE database, had not been reviewed and approved by the NRC staff.

The SLICE database program was developed using the Stolpe methodology.[1] The experimental work and theory developed by J. Stolpe and others was an accepted methodology utilized in the Insulated Cable Engineers Association (ICEA) and National Electrical Manufacturers Association (NEMA) Standards Publication Number ICEA P-54-440/NEMA WC 51, for calculating "Ampacities of Cables in Open-top Cable Trays" to provide a more accurate means of calculating cable tray ampacities.

The licensee generated Calculation 9198-13-19-1, "Calculation for SLICE Cable Ampacity Multiplying Factors for the Dresden and Quad Cities Stations," Revision 0, dated August 24, 1994, to address inherent conservatism in the SLICE database program. Specifically, the scope of this calculation was to perform analysis and establish a mathematical relationship for refinement of the SLICE calculated ampacities based on cable tray temperature and cable current measurement data for the purpose of investigating whether ampacities higher than the SLICE calculated values could be justified. Initially, cable tray temperature measurements were made at Dresden and Quad Cities Stations for a representative sample of low, medium, and high thermally and physically loaded cable tray points (10 routing points per station). However, the licensee stated that the selected routing points did not bound all possible cases and the number of sample points were low, which resulted in extremely conservative multiplying factors being selected. As a result, the licensee generated Calculation QDC-0000-E-0853, "SLICE Cable Ampacity Multiplying Factors for Quad Cities," Revision 0, dated December 2, 1999, where an additional 25 cable tray routing points were selected for temperature measurements at Quad Cities Station. The purpose of this calculation was to determine the load and geometric diversity factors based on the additional cable tray temperature measurements and to select more reasonable ampacity multiplying factors, if possible, which could be applied to the SLICE program to adjust the SLICE ampacity values to reflect the cable tray temperature measurement test results.

Analysis: Based on a cursory review of Calculation QDC-0000-E-0853, the inspectors concluded that the calculation did not follow the requirements of CC-AA-309-1001, "Guidelines for Preparation and Processing Design Analyses," Revision 0. To address this issue, the licensee initiated condition report (CR) 00182702, "Deficiency Identified in Calculation QDC-0000-E-0853," Revision 0, dated October 24, 2003. In addition, the inspectors noted that no bounding assumptions were identified in the calculation and, as such, the inspectors were concerned that potential undocumented assumptions may exist. The inspectors also noted that the testing used to support the calculation's development (identified in Attachment F, Technical Paper - Braidwood Ampacity Testing) used different cable types and cable tray sizes from those used at the Quad Cities Nuclear Power Station. The effect of these differences on the ampacity multiplying factors were not discussed in the calculation.

[1] IEEE [Institute of Electrical and Electronics Engineers] Transactions on Power Apparatus and Systems, Paper 70 TP 557 PWR, "Ampacities for Cables in Randomly Filled Trays," by J. Stolpe, 1970

Enforcement: Based on the review of the previous items, the inspectors were not able to confirm that the methodology used in the most recent calculation had been reviewed by the NRC. As a result, this issue will be treated as an Unresolved Item (URI) pending further evaluation of the adequacy of the licensee cable ampacity calculation methodology by the NRC staff. (URI 05000254/2003012-01; 05000265/2003012-01)

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed the corrective action program procedures and samples of corrective action documents to verify that the licensee was identifying issues related to fire protection at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed selected samples of condition reports, work orders, design packages, and fire protection system non-conformance documents.

b. Findings

No findings of significance were identified.

4OA5 Other

(Open) Unresolved Item 05000254/2000016-04; 05000265/2000016-04: Single spurious operation, including effects of automatic depressurization system failures on the time line for achieving safe shutdown. This item was originally discussed in Section E1.4 of Inspection Report 50-254/98-11; 50-265/98-11. Most of the original item was closed in Inspection Report 50-254/00-16; 50-265/00-16. However, the portion involved associated circuits remained open and was tracked under this item. Pending completion of the NRC and industry review and resolution of associated circuit issues affecting safe shutdown, this item will remain open as an Unresolved Item (URI).

4OA6 Meeting(s)

Exit Meeting

An exit meeting was conducted for:

Routine Triennial Fire Protection, with Mr. Tulon and other members of licensee management at the Quad Cities Nuclear Power Station on October 24, 2003. The licensee identified proprietary material reviewed during the inspection. The licensee acknowledged that this material had been returned.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
T. Tulon, Site Vice-President
W. Beck, Regulatory Assurance Manager
T. Bell, Deputy Engineering Director
D. Boyles, Operations Support Manager
A. Scott, Shift Operations Superintendent

NRC
K. Stoedter, Senior Resident Inspector

Illinois Emergency Management Agency
R. Ganser, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000254/2003012-01 05000265/2003012-01	URI	Cable Ampacity Calculation Methodology (Section 1R05.12)

Closed

None.

Discussed

05000254/2000016-04 05000265/2000016-04	URI	Associated Circuits Issue. Single Spurious Operation, Including Effect of Automatic Depressurization System Failures on the Time Line (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection, including documents prepared by others for the licensee. Inclusion on this list does not imply that NRC inspectors reviewed the documents in their entirety, but, rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort.

Assessments

NOSA-QDC-03-10; NOS Fire Protection Audit Report; dated June 12, 2003

Quad Cities Station Fire Protection Self-Assessment Report; dated September 26, 2003

Condition Reports

00097344; NRC Issues Found During Plant Tour; dated March 1, 2002

00116235; Unit 1 Turbine Oil Tank Local Fire Bell Did Not Sound; dated July 18, 2002

00116796; Fire Marshall Plant Walkdown Identified Deficiencies; dated July 24, 2002

00130881; Control Room Did Not Receive Alarms During T12 Deluge Test; dated November 9, 2002

00131922; Fire in The U-1 Turbine Building Elev. 595, At C & 15; dated November 15, 2002

00139229; Deficiency Noted on The Structural Steel Fire Coating; dated January 13, 2003

00143638; Reactor Feed Pump Room Fire Watch Missed; dated February 8, 2003

00159454; NRC NCV 03-03-01 Concerning Diesel Fire Pumps; dated May 19, 2003

00169342; Both Fire Pump Diesel Engines Experiencing Identical Cracks; dated July 28, 2003

00173848; Fire Coating on Steel Beams Missing Battery and Charger Rooms; dated September 1, 2003

Q2000-00244; Safe Shutdown Makeup Pump Inoperable Due To MO 2-2901-8; LCO Entered; dated January 19, 2000

Q2000-01086; Fire Protection Impairments Exceeded 14 Day ATR; dated March 10, 2000

Condition Reports Initiated as a Result of Inspection:

00179587; Tie Wraps Found Broken; dated October 6, 2003

00179915; QCOA 4100-01 Attachment A Not up to Date; dated October 8, 2003

00180384; Cable Ampacity Input Discrepancies in SLICE Database; dated October 10, 2003

00180993; Equipment Incorrectly Identified on Plant Drawing; dated October 16, 2003

00182172; Appendix R Compliance Database not Updated for DCP; dated October 21, 2003

00182684; Fire detection & suppression in U1 Trackway and RFP issues; dated October 24, 2003

00182702; Deficiency Identified in Calculation QDC-0000-E-0853, R/O; dated October 24, 2003

Drawings

4E-465C; Wiring Diagram Master Supply Panel 912-8 Part 4 Safe Shutdown System; Revision H

4E-1049; Cable Routing Turbine & Reactor Building and Crib House Ground Floor; Revision S

4E-1050; Cable Routing Turbine & Reactor Building Ground Floor; Revision BE

4E-1051; Cable Routing Turbine & Reactor Building Mezzanine Floor; Revision AP

4E-1051A; Cable Routing Turbine & Reactor Building Mezzanine Floor Environmental Qualification Instrument Upgrade Division Trays; Revision D

4E-1063; Electrical Installation Turbine Building Plan EL 595’ - 0" Southeast; Revision CD

4E-1063A; Electrical Installation Turbine Building Plan EL 595’ - 0" Southeast; Revision AH

4E-1096; Electrical Installation Crib House Plans EL 559’ - 8" and 595’ - 0" ; Revision BJ

4E-1113; Electrical Installation Cable Tunnel Plan; Revision AW

4E-1350B; Schematic Diagram Diesel Generator 1 Auxiliaries & Start Relays; Revision AM

4E-1350C; Schematic Diagram Diesel Fuel Oil Transfer Pump 1 and 2 Feed Controls; Revision Q

4E-1438C; Schematic Diagram Residual Heat Removal System Relay Logic Division I, Sheet 3; Revisions AM and AN

4E-1438G, Sheet 2; Schematic Diagram Residual Heat Removal System Process Instrumentation Sheet 7; Revision AF

4E-1438J, Sheet 2; Schematic Diagram Residual Heat Removal System Motor Operated Valves - Division I; Revision AF

4E-1438Q; Schematic Diagram Residual Heat Removal System Sheet 15 Pumps 1002A, B, C, D 4160V Breaker Control Division I and II; Revision Z

4E-1644, Sheet 1; Wiring Diagram Standby Diesel Generator 1 Engine Equipment Control Panel 2251-113; Revision C

4E-1644, Sheet 2; Wiring Diagram and Mounting Detail DG Engine Equipment Control Panel 2251-113A; Revision B

4E-1646A; Wiring Diagram Diesel Generator 1 Auxiliary Control Panel 2251-37; Revision AE

4E-1655A; Wiring Diagram 4160V Switchgear Bus 13-1 Cubicles 1, 2, 3, 4, and 5; Revision BC

4E-1655B; Wiring Diagram 4160V Switchgear Bus 13-1 Cubicles 6, 7, 8, 9, and 10; Revision U

4E-1678B; Wiring & Schematic Diagram Reactor Building Essential Service 480V MCC 19-1 Part 2; Revision AN

4E-1685A; Wiring Diagram Turbine Building 125Vdc Reserve Bus 1B-1 Distribution Panel; Revision AR

4E-1686; Wiring Diagram Reactor Building 125Vdc Distribution Panel 1; Revision AD

4E-1699; Wiring Diagram Panel 901-3; Revision BP

4E-1701; Wiring Diagram Main Control Board Panel 901-3; Revision BY

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QDC-SSD-LOG-002; Legend Safe Shutdown Logic Diagram; dated December 18, 1996

QDC-SSD-LOG-003; Appendix R Safe Shutdown System Logic Diagram; dated November 14, 2000

QDC-SSD-LOG-101; Safe Shutdown Makeup System Safe Shutdown Logic Diagram; dated August 8, 2002

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Letter to Thomas Ippolito from Robert Janecek; Quad Cities Station Units 1 and 2 Additional Information for Fire Protection Modifications NRC Docket Nos. 50-254 and 50-265; dated November 5, 1979

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
CR	Condition Report
DPR	Demonstration Power Reactor
DRS	Division of Reactor Safety
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
IR	Inspection Report
LLC	Limited Liability Company
NEMA	National Electrical Manufacturers Association
NRC	U.S. Nuclear Regulatory Commission
SDP	Significance Determination Process
SLICE	Sargent and Lundy Interactive Cable Engineering
SSMP	Safe Shutdown Makeup Pump
URI	Unresolved Item