

March 1, 2002

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
Quad Cities Nuclear Power Station
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION
NRC INSPECTION REPORT 50-254/01-15(DRS); 50-265/01-15(DRS)

Dear Mr. Kingsley:

On February 1, 2002, the NRC completed a baseline inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The results of this inspection were discussed on February 1, 2002, with Mr. T. Tulon and other members of your staff.

This inspection was an examination of activities conducted under your license as they related to safety and 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. Specifically, the inspection focused on the design and performance capability of the diesel generator cooling water and residual heat removal service water systems to ensure the systems were capable of performing required safety related functions.

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green). This issue was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your corrective action program, the NRC is treating this issue as a Non-Cited Violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny this Non-Cited Violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Quad Cities facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

O. Kingsley

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We will gladly discuss any questions you have concerning this inspection.

Sincerely,

/RA/

John M. Jacobson, Chief
Mechanical Engineering Branch
Division of Reactor Safety

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

Enclosure: Inspection Report 50-254/01-15(DRS);
50-265/01-15(DRS)

cc w/encl: W. Bohlke, Senior Vice President, Nuclear Services
C. Crane, Senior Vice President - Mid-West Regional
J. Cotton, Senior Vice President - Operations Support
J. Benjamin, Vice President - Licensing and Regulatory Affairs
K. Ainger, Director - Licensing
R. Hovey, Operations Vice President
J. Skolds, Chief Operating Officer
R. Helfrich, Senior Counsel, Nuclear
DCD - Licensing
T. J. Tulon, Site Vice President
M. Perito, Acting Quad Cities Station Manager
W. Beck, Regulatory Affairs Manager
W. Leach, Manager - Nuclear
Vice President - Law and Regulatory Affairs
Mid American Energy Company
M. Aguilar, Assistant Attorney General
Illinois Department of Nuclear Safety
State Liaison Officer, State of Illinois
State Liaison Officer, State of Iowa
Chairman, Illinois Commerce Commission

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Mid American Energy Company
M. Aguilar, Assistant Attorney General
Illinois Department of Nuclear Safety
State Liaison Officer, State of Illinois
State Liaison Officer, State of Iowa
Chairman, Illinois Commerce Commission

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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: 50-254/01-15; 50-265/01-15

Licensee: Exelon Generation Company, LLC

Facility: Quad Cities Nuclear Power Station, Units 1 and 2

Location: 22710 206th Avenue North
Cordova, IL 61242

Inspection Dates: January 14 through February 1, 2002

Inspectors: A. Dunlop, Lead Inspector
J. Gavula, Reactor Inspector
M. Farber, Reactor Inspector
G. O'Dwyer, Reactor Inspector
S. Sheldon, Reactor Inspector
B. Quirk, Contractor

Approved by: John M. Jacobson, Chief
Mechanical Engineering Branch
Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000254-01-15(DRS); IR 05000265-01-15(DRS), on 1/14/2002 through 2/1/2002, Exelon Generation Company, LLC, Quad Cities Nuclear Power Station, Units 1 and 2. Safety System Design and Performance Capability.

The inspection was routine baseline inspection of the design and performance capability of the diesel generator cooling water and residual heat removal service water systems. It was conducted by regional engineering specialists and a consultant. The inspection identified one Green finding, which was a Non-Cited Violation. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www/nrc.gov/NRR/OVERSIGHT/index.html>. Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violations.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a failure to promptly identify and correct conditions adverse to quality involving the erosion of safety-related residual heat removal service water piping. The licensee's corrective actions for the piping leak included replacing the affected piping and performing ultrasonic testing on similar piping for the other trains. During this inspection, NRC inspectors identified that the corrective actions were inadequate in that the ultrasonic testing was not able to examine the area of the piping affected by the erosion as evidenced by a subsequent failure.

This finding was determined to be of very low safety significance because the equipment was still capable of performing its intended safety function. A Non-Cited Violation of 10CFR 50 Appendix B, Criterion XVI was identified. (Section 4OA2.b)

Report Details

1. REACTOR SAFETY

Cornerstones: Mitigating Systems and Barrier Integrity

1R21 Safety System Design and Performance Capability (71111.21)

Introduction

Inspection of safety system design and performance verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected system to perform design bases functions. As plants age, the design bases may be lost and important design features may be altered or disabled. The plant risk assessment model is based on the capability of the as-built safety system to perform the intended safety functions successfully. This inspectable area will verify aspects of the mitigating systems and barrier integrity cornerstones for which there are no indicators to measure performance.

The objective of the safety system design and performance capability inspection was to assess the adequacy of calculations, analyses, other engineering documents, and operational and testing practices that were used to support the performance of the diesel generator cooling water (DGCW) and residual heat removal service water (RHRSW) systems during normal, abnormal, and accident conditions. The inspection was performed by a team of inspectors that consisted of a team leader, four Region III inspectors, and a consultant.

The DGCW and RHRSW systems were selected for review during this inspection. This selection was based upon:

- having a high probabilistic risk analysis ranking;
- having had recent significant modifications; and
- not having received recent NRC review.

The criteria used to determine the system's performance included:

- applicable Technical Specifications;
- applicable Updated Final Safety Analysis Report sections; and
- the systems design documents.

a. Inspection Scope

The following system and component attributes were reviewed in detail:

System Needs

Process Medium - water

Energy Source - electrical power

Control Systems - initiation, control, and shutdown actions
Operator Actions - initiation, monitoring, control, and shutdown
Heat Removal - cooling water

System Condition and Capability

Installed Configuration - elevation and flow path operation
Design - calculations and procedures
Testing - flow rate, pressure, temperature, voltage, and current

Components

Four components were selected for detailed review during the inspection. The chosen components were the RHRSW pumps, RHRSW control valves, DGCW pumps, and residual heat removal heat exchangers. The following attributes were reviewed for these components:

Component Degradation
Vibration
Operation
Equipment Protection - flood, missile and freezing
Component Inputs and Outputs
Industry Operating Experience

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed a selected sample of condition reports (CRs), associated with the selected systems, to verify an appropriate threshold for identifying issues and to verify the adequacy of corrective actions for the identified issues. In addition, CRs written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system.

b. Findings

Erosion of Safety-Related Piping Not Adequately Addressed

The inspectors identified one Green Finding that is being treated as a Non-Cited Violation of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," for the failure to promptly identify and correct a condition adverse to quality.

In August, 1998 plant staff identified a pinhole leak in the 1D RHRSW vault room cooler supply piping and initiated CR Q1998-03559. The CR attributed the leak to under deposit corrosion. The corrective actions included performing ultrasonic tests (UTs) of the remaining seven RHRSW room coolers' supply piping. The UTs in 1999 identified that the 2C pipe had wall thinning below design requirements. The wall thinning was documented on CR Q1999-02232 and the piping was replaced. The UTs did not indicate wall thinning of the remaining room cooler supply piping. However, a pinhole leak of the 2A room coolers' supply piping occurred in February 2000, which was documented on CR Q2000-00599. When the leaking 2A piping was replaced in May of 2000, the licensee examined the damaged section of piping. The licensee concluded that the failure mechanism was not under deposit corrosion, but instead appeared to be cavitation-induced erosion due to a flow restricting orifice in the piping. In addition, the licensee's evaluation documented on the 2000 CR concluded that the UT on the 2A piping had been inadequate to detect the pipe wall thinning. The UT had not examined the portion of piping affected by the erosion due a pipe flange interference.

The cavitation erosion can cause significant wall loss around the entire pipe circumference thereby challenging structural integrity of the piping. The significance that the cause of the wall thinning was general area erosion rather than localized corrosion was not completely recognized. The licensee did begin preparing long-term modifications to address the erosion issue for all the room cooler supply piping by replacing each flow restricting orifice plate with two. However, the immediate condition of the six remaining coolers supply piping was not adequately investigated or re-evaluated to ensure operability. When the inspectors questioned why the other UTs performed in 1999 were acceptable to address the operability and structural integrity of the piping for the remaining room coolers based on the inspection results on the 2A piping, the licensee initiated CR 93444. The licensee re-performed the UTs and identified that the 2B and 2D room cooler supply piping were also below design minimum wall requirements. An operability evaluation performed by the licensee concluded that the pipe wall thicknesses were above the code required minimum requirements for operability, such that the piping and associated system was determined to be operable but degraded. The licensee promptly replaced the degraded piping. The licensee appropriately followed their corrective action process, e.g., reviewing other systems for susceptibility to this phenomenon and ensuring a reasonable basis for assuming all the systems were operable.

The inspectors concluded that the failure of the RHRSW room coolers' supply piping due to continuing erosion had a credible impact on safety, which affected and could have again affected the operability, availability, reliability, or function of a train in a mitigating system. The failure to identify and correct the continuing erosion was a condition adverse to quality. This was determined to be of very low significance (Green) by the significance determination process because the equipment was still capable of performing its intended safety function.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to this, the licensee failed to identify and correct continuing erosion in safety-related RHRSW room coolers' supply piping, a condition adverse to quality. This violation of 10 CFR 50, Appendix B, Criterion XVI, is being treated as a Non-Cited Violation consistent with Section VI.A of the NRC Enforcement

Policy (NCV 50-254/01-15-01; 50-265/01-15-01). This finding is in the licensee's corrective action program as CR 93444.

4OA6 Meeting

Exit Meeting

The inspectors presented the inspection results to Mr. T. Tulon and other members of licensee management and staff at the conclusion of the inspection on February 1, 2002. The licensee acknowledged the information discussed during the exit. No proprietary information was identified.

KEY POINTS OF CONTACT

Licensee

W. Beck, Regulatory Assurance Manager
S. Campagne, Electrical Design Engineering
T. Fuhs, Regulatory Assurance
S. Laughlin, Diesel Generator System Engineer
S. Mroz, Mechanical Design Engineer
P. O'Brien, Engineering Assessor
M. Perito, Acting Plant Manager
T. Peterson, Regulatory Assurance
B. Porter, Design Engineering
J. Potts, Heat Exchanger Engineer
M. Snow, Nuclear Oversight
B. Strub, RHRSW System Engineer
J. Taft, Design Engineering
M. Tucker, Corporate Electrical Design Engineering
T. Tulon, Site Vice President
J. Wethington, Design Engineering

NRC

J. Adams, Resident Inspector
K. Stoedter, Senior Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

50-254/01-15-01/ 50-265/01-15-01	NCV	Failure to adequately address the erosion of the RHRSW room coolers' supply piping
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LIST OF ACRONYMS USED

ADAMS	Agency-wide Documents and Management System
CR	Condition Report
CFR	Code of Federal Regulations
DGCW	Diesel Generator Cooling Water
DRS	Division of Reactor Safety
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
PARS	Publically Available Records
RHRSW	Residual Heat Removal Service Water
SDP	Significance Determination Process
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Test

LIST OF DOCUMENTS REVIEWED

Calculations

Number	Title	Revision or Date
ATD-0010	FLO-SERIES Model of RHRSW System	Revision 2
ATD-0155	Diesel Generator Cooling Water Hydraulic Calculation	Revision 0
ATD-0189	Diesel Generator Cooling Water System Hydraulic Model Calibration	Revision 0
CMED-058089	RHRSW Pump / Motor Mounting Bolts	Revision 00
CQD-042415	Evaluation of the Effect of High Ambient Temperature on the RHRSW Motors	March 29, 1989
DCR-990455	Affect of DCP 9900295 on RHRSW Flow Model	Revision 0
DCR-990457	Affect of DCP 9900295 on Head Loss Across RHRSW	Revision 0
EMD-067922	Evaluation of Suction Piping to RHRSW Pumps 2-1001-65A and 2-1001-65B	Revision 00
NED-EIC-MOV-QC-0001	Motor Operated Valve Terminal Voltage Calculation	Revision 1
NED-E-EIC-0055	Thermal Overload Heaters for Motor Operated Valves 1(2)-1001-5A/5B	Revision 0
NED-I-EIC-0219	RHR HX Service Water Tube to Shell D/P Trip System Error Analysis and RHR HX Service Water Outlet Pressure Indication Error Analysis at Normal Operating Conditions	Revision 0
NED-M-MSD-47	Quad Cities RHR Heat Exchanger Performance Requirements as a Function of River Temp	Revision 0
NED-M-MSD-116	Quad Cities RHR Heat Exchanger Acceptance Criteria Development	Revision 0
QC-IET-E-002	Evaluation of Thermal Overload Heaters for Motor Operated Valves, 1-1001-4A and 1-1001-4B	Revision 0
QC-NPD-96-0002	M01-1001-5A & B Post Modification Vibration Test Evaluation	Revision 0
QDC-0000-E-0206	Motor Terminal Voltage Calculations for Quad Cities Unit 1 and Unit 2 Generic Letter 89-10 Motor Operated Valves	Revision 1

Calculations

Number	Title	Revision or Date
QDC-1000-E-148	Replacement Fixed Resistor for MOV-1-1001-5A Position Indication Circuit	Revision 0
QDC-1000-E-0169	Minimum Required Voltage for RHRSW Pump Cooler Fans	Revision 1
QDC-1000-E-0171	Minimum Required Voltage for RHR Emergency Air Handling Unit	Revision 0
QDC-6700-I-0834	Instrument Drift Analysis of ABB Model 411T4375 Voltage Relays for 4.16kV Emergency Bus (Degraded Voltage)	Revision 0
QDC-6700-I-0935	4kV Degraded Voltage Time Delay Setpoint Error Analysis	Revision 0
QDC-1000-M-0131	Net Positive Suction Head Availability vs Requirements for DGCW and RHRSW	Revision 2
QDC-1000-M-0337	Effect of Screen Blockage on the Water Level in the Residual Heat Removal Service Water Bay	Revision 2
QDC-1000-M-0698	Design Basis Analysis of RHR Heat Exchanger Cooling Capacity	Revision 0
QDC-1400-E-0170	Minimum Required Voltage for Core Spray Emergency Air Handling Unit Motors	Revision 0
QDC-5700-E-0173	Minimum Required Voltage for Diesel Generator Vent Fans	Revision 0
QDC-5700-H-0695	RHR and RHRSW Pump Room Cooling Following Failure of Lock and Dam 14	Revision 0
QDC-5700-H-0695	RHR and RHRSW Pump Room Cooling Following Failure of Lock and Dam 14	Revision 000A
QDC-6600-E-0174	Minimum Required Voltage for DGCWP	Revision 1
VT-16	RHRSW and DGCW Pump Room Cooler Performance Evaluation	Revision 1A
055607(CMED)	Revise Mounting Evaluation for Toshiba/Houston 100 HP Motor	May 14, 1993
067038(EMD)	RHRSW Pump Vault Humidity Reduction Mod.	Revision 0
8549-84-19-2	Determining Voltage at Terminals of Starter and Control Relays	Revision 0

Calculations

Number	Title	Revision or Date
8913-67-19-1	Quad Cities Unit 1 Div I Safety Related Load Running/Starting Voltages	Revision1
8913-67-19-3	Second Level Undervoltage Relay Setpoint U1	Revision 1
8913-69-19-1	Quad Cities Unit 1 Div II Safety Related Load Running/Starting Voltages	Revision 1
8913-71-19-1	Quad Cities Unit 2 Div I Safety Related Load Running/Starting Voltages	Revision 2
8913-71-19-2	Second Level Undervoltage Relay Setpoint U2 Division I	Revision 1
8913-73-19-1	Quad Cities Unit 2 Div II Safety Related Load Running/Starting Voltages	Revision 1
8913-73-19-3	Evaluation of 460V Diesel Generator Cooling Water Pump Minimum Starting Voltage	Revision 00A
8913-73-19-4	Second Level Undervoltage Relay Setpoint U2 Division II	Revision 2
8913-73-19-3	Nonsize 2 Motor Control Center (MCC) Control Voltage Contactor Circuit Lengths fed From Switchgear 29	Revision 0
8913-73-19-7	Circuit Breaker Setting for New Toshiba DG Cooling Water Pump Motors	Revision 0
9048-37-19-4	Application of 15 Amp Bussman KTK-R Fuse to the DGCW Pump Cooler Fan Motor Circuits	Revision 0
9048-37-19-5	Size of Overload Heaters for DG 1/2 Cooling Water Pump Cooling Fans	Revision 0
9149-15-19-2	Minimum Running Voltage for DGCW Cooler Fan & RHRS Emergency Air Handling Unit	Revision 0
9149-20-19-1	125 VDC Bus Voltage Calculations for Quad Cities Station	Revision 8

Condition Reports Generated Due to the Inspection

Number	Title	Revision or Date
CR 90937	Drawing Error on 3-Way Valve (M-22; M-69)	January 16, 2002
CR 91766	RHRSW Load is Different in QCOA 6100-03, 04 (SBO)	January 22, 2002

Condition Reports Generated Due to the Inspection

Number	Title	Revision or Date
CR 91837	Errors Identified on DGCW P&IDs M-22 Sheet 5 and M-69 Sheet 5	January 23, 2002
CR 91880	Reduced Seismic Criteria Used to Qualify RHRSW Piping	January 23, 2002
CR 92983	UFSAR Discrepancy 75% Minimum Motor Start Voltage	January 29, 2002
CR 93012	Inconsistencies in UFSAR Section 3.4.1.2.1.2 Regarding RHRSW Vault Flood Protection	January 29, 2002
CR 93016	Ultimate Heat Sink Instrument Uncertainties	January 29, 2002
CR 93115	Calculation Qualification of Turned-down RHRSW Pump Anchor Bolts	January 30, 2002
CR 93281	MCC Voltages in Degraded Volt Calculations	January 31, 2002
CR 93308	Discrepancies Between ELMS and Voltage Calculations	January 31, 2002
CR 93336	Op Evaluation for 1A RHR HX Leak Needs Enhancement	January 31, 2002
CR 93368	IST Data Shows Higher Suction Losses for U1 DGCW/RHRSW Pumps	January 31, 2002
CR 93385	Different RHRSW Suction Minimum Water Level Values in Calculation and in QCOA 0010-14	January 31, 2002
CR 93394	CREVS Degraded Voltage Procedure Load Shedding Discrepancy	January 31, 2002
CR 93444	RHRSW Vault Room Cooler Leak Operability Evaluation Inadequate Follow-up	February 1, 2002

Condition Reports Reviewed During the Inspection

Number	Title	Revision or Date
PIF 95-00570	Bus 28 and 29 Cross-tied During Shutdown	March 8, 1995
PIF 96-01096	U1 DGCW Pump Cubicle Cooler Fan Motor Wired Incorrectly	March 25, 1996
PIF 96-01920	Discrepancies in Cable Lengths	May 26, 1996
PIF 98-00342	Fouling Factors Assumed for RHRSW and DGCW Coolers May be Incorrect	January 21, 2001
Q1997-0428	1/2 DGCW Pump Inboard Bearing Temperature and Discolored Oil	February 20, 1997

Condition Reports Reviewed During the Inspection

Number	Title	Revision or Date
Q1997-02568	Component Classification	July 7, 1997
Q1997-02823	1A RHR Rm Cooler DP Above Limit	July 11, 1997
Q1997-02824	1B Core Spray Rm Cooler DP Above Limit	July 15, 1997
Q1997-03497	2A Core Spray Rm Cooler Low Flow	September 24, 1997
Q1998-00383	Pump Performance Acceptance Criteria Do Not Include Instrument Tolerance	February 6, 1998
Q1998-01282	Ultimate Heat Sink Evaluation	March 24, 1998
Q1998-01363	Error in Calculation MECH-13, RHRSW Pump Motor BHP Requirements	March 19, 1998
Q1998-01508	RHR Heat Exchanger Operability Determination	April 10, 1998
Q1998-02496	Possible Mixing of Motor Bearing Grease on 1B RHR Room Cooler	May 17, 1998
Q1998-03559	Pinhole Leak in the 1D RHRSW Vault Room Cooler Supply Piping	August 4, 1998
Q1998-05492	Unit 2 HPCI Room Cooler West End Baffle Plate Gaskets Found Missing During Inspection	December 11, 1998
Q1999-00593	1/2 DG Cooling Water Pump Motor Amps Not Balanced	February 17, 1999
Q1999-02053	Unit 1/2 EDGCWP Procedural Guidance Inadequate	June 16, 1999
Q1999-02232	2C RHRSW Vault Room Cooler Supply Piping below Minimum Wall	June 30, 1999
Q1999-02552	QCOS 6600-01, Diesel Generator Monthly Load Test	August 3, 1999
Q1999-02645	B CR HVAC RCU is Affecting RHRSW Pump Curve	August 19, 1999
Q1999-02845	1/2 D/G Availability During QCOS 6600-01	August 30, 1999
Q1999-03001	Inadequate Sharing of OPEX/PIF Information Between Departments	September 12, 1999
Q1999-03285	1/2 DGCWP CV Failed to Close on Spring Force Alone	September 28, 1999
Q1999-03451	Incorrect Flow Cited in UFSAR for ECCS Room Coolers	October 12, 1999
Q1999-03903	1A RHRSW Vault Sump Pump Discharge Check Valve Found Stuck Open	November 10, 1999
Q2000-00046	Failure of 2B RHRSW Vault Sump Pump Discharge Check Valve	January 5, 2000

Condition Reports Reviewed During the Inspection

Number	Title	Revision or Date
Q2000-00599	2A RHRSW Vault Room Cooler Leak	February 3, 2000
Q2000-00634	High Flow on U2 Diesel Generator Cooling Water Pump	February 5, 2000
Q2000-00801	Silt in RHRSW Pump Bay	February 15, 2000
Q2000-00968	Print Does Not Match Installed	February 29, 2000
Q2000-01032	Adverse Trend: U-2C RHRSW Vibrations	March 7, 2000
Q2000-01481	Silt, Zebra Mussels, and partially plugged screens in RHRSW Pump Bay	April 11, 2000
Q2000-01775	Unit 1 C RHRSW HP Pump Inboard Bearing Oil Analysis Results	May 9, 2000
Q2000-01801	1D RHRSW Pump Failure	May 11, 2000
Q2000-03225	Smoke From MCC 28-2 RHRSW Pump B Fan Breaker	September 8, 2000
Q2000-03473	Unit DGCWP Auto Start Capability vs ECCS Room	October 2, 2000
Q2000-03552	As Found Condition of RHRSW Intake Bay	October 10, 2000
Q2000-04076	Smoke From MCC 28-2 RHRSW Pump A Fan Breaker	November 3, 2000
Q2000-04083	RHRSW Valves to B Control Room HVAC Found Out of Position	November 3, 2000
Q2000-04287	Venting EDG Flow Indicators	December 1, 2000
Q2001-00040	December Oil Sample for U1 DGCW Pump Indicates High Water	Jan 4, 2001
Q2001-00296	Valve 2-1001-185A Failed to Close	January 27, 2001
Q2001-00416	RHRSW Vault Sump Pump Float Obstructed Preventing Pump Operation	February 6, 2001
Q2001-00679	Calculation VT-16 Needs Revision	February 26, 2001
Q2001-00811	FME from Tail End of Spring from a Check Valve in RHRSW System	March 14, 2001
Q2001-00833	Zebra Mussels on Trash Rake of Unit 2 Intake Bay	March 17, 2001
Q2001-01364	Erratic Flow Indication for 1/2 DGCW Pump	May 6, 2001
Q2001-01521	Bases of ITS Section 3.7.2 Appears More Restrictive than the LCO	May 18, 2001
Q2001-01673	Discrepancies with EPU Calculation QDC-3900-M-1077	June 1, 2001

Condition Reports Reviewed During the Inspection

Number	Title	Revision or Date
Q2001-01802	Unnecessary Cycling of Safety-related Equipment	June 4, 2001
Q2001-02396	Pressure Gauges OOT	July 30, 2001
Q2001-02645	Slime Growth on Unit 1 DGCWP	August 22, 2001
Q2001-02993	Crib House Center Bay Screen	September 25, 2001
Q2001-03054	RHRSW Pump Discharge Check Valve Found with Broken Spring	October 2, 2001
Q2001-03134	Calculation Status in Passport	October 5, 2001
Q2001-03159	1A RHR Heat Exchanger Leaking from Reactor Side in Service Water Side	October 11, 2001
Q2001-03191	RHRSW Pump CV Surveillance Found CV Degraded but Functional	October 16, 2001
Q2001-03192	As Found VOTES Testing Reveals Actuator Structural Limits were Exceeded	October 17, 2001
CR 0080088	Long Time Delay Setting for DGCWP Motor Feed Breakers	October 24, 2001
CR 0086930	Issues Involved with 2A RHR Room Cooler Normal Power Contactor	December 17, 2001

Design Change Packages

Number	Title	Revision or Date
0000022339	MOV 1-1001-4A/4B Thermal Overload Heater Change	February 4, 1998
DCP 9800103	Thermal Overload Replacement for MCC 28-1A for RB Temp. Issue	March 24, 1998
DCP 9900029	Install sacrificial anodes in heads of DGHXs	September 2, 1999
DCP 9900171	4KV Bus Crosstie Control Circuit Modification	June 29, 2000
DCP-9900355	SQUG - Brace HPCI Room Cooler 2-5747	Revision 0
E04-1-93-306	RHR Valve Replacements: Valve Nos. MO 1-1001-5A and MO 1-1001-5B	June 12, 1996
M-4-1-74-35	Modification of the RHRSW Discharge Piping	January 12, 1981
M-4-1-74-049	RHRSW Discharge Piping	July 17, 1974

Design Change Packages

Number	Title	Revision or Date
M-4-1-85-036A-D	Install Pressure Taps on Suction Side of RHRSW Pumps and Unit 2 DGCW Pump	April 15, 1988
M04-1-87-002-A	RHRSW Pump Impeller replacement	June 12, 1989
M-4-1/2-74-012	!A/2A RHRSW Cross Tie	December 5, 1980
M-4-1/2-85-14	Install Selector Switch in 1/2 DG Room to Select Power Supply for 1/2 DG Cooling Water Pump	December 1, 1986
M04-2-87-002D	RHRSW Pump 2D Impeller Replacement	
M04-2-87-026	ECCS Room Cooler Instrumentation	January 31, 1996
M04-2-92-006I	Redundant Power Feed 1/2-5749 A & B	July 31, 1992
M4-1(2)-74-35	RHR Heat Exchanger Service Water Discharge Piping	May 5, 1980

Design Information Transmittal

Number	Title	Revision or Date
DG00-000923	EPU DIR for EPU Task T0401-Form OPL-4A (PDLB version)	August 1, 2000
DIT-QC-EXT-0153	RHRSW HP Pump Cut-water Mod Calc	May 19, 1993
NDIT QDC-98-170	RHRSW and DGCW Fan Motor Thermal Aging Report for Westinghouse Class B Motors	May 12, 1998
QDC-98-218	Additional Parameters to be used in Quad Cities Containment Analyses	July 31, 1998
QDC-98-218-01	Reference Clarification Performed in Response to PIF Q1999-00324	April 28, 1999

Drawings

Number	Title	Revision or Date
4E-1303	Key Diagram 4160V Switchgear 11, 12, 13 14	T
4E-1310	Key Diagram Turbine Building Essential Service MCC's 18-2, 19-2, & 19-3	AK
4E-1318B	Overall Key Diagram 125 V DC Distribution Centers	Revision J
4E-1328	Single Line Diagram Emergency Power System	Revision F

Drawings

Number	Title	Revision or Date
4E-1349 Sheet 1	Schematic Diagram 480V Transformer 18 & 19 and Bus 18 & 19 Main Breakers	Revision T
4E-1349 Sheet 2	Schematic Diagram 480V Transformer 18 & 19 and Bus 18 & 19 Main Breakers	Revision R
4E-1349 Sheet 3	Schematic Diagram 480V Transformer 18 & 19 and Bus 18 & 19 Main Breakers	Revision U
4E-1350A Sheet 1	Schematic Diagram Engine Control & Generator Excitation Standby Diesel Generator 1	Revision AL
4E-1350A Sheet 2	Schematic Diagram Engine Control & Generator Excitation Standby Diesel Generator 1	Revision AH
4E-1350B Sheet 1	Schematic Diagram Diesel Generator 1 Auxiliaries & Start Relays	Revision AK
4E-1350B Sheet 3	Schematic Diagram Diesel Generator 1 Auxiliaries & Start Relays	Revision AL
4E-1350D	Schematic Diagram Fuel Pool Cooling Water Pump 1B & DGCW Pump 2 Feed Transfer Control	Revision G
4E-1351A Sheet 1	Schematic Control Diagram Engine Control & Generator Excitation Standby Diesel Generator 1/2	Revision AN
4E-1351A Sheet 2	Schematic Diagram Engine Control & Generator Excitation Standby Diesel Generator 1/2	Revision AH
4E-1351B Sheet 1	Schematic Diagram Diesel Generator 1/2 Auxiliaries & Start Relays	Revision R
4E-1351B Sheet 2	Schematic Diagram Diesel Generator 1/2 Auxiliaries & Start Relays	Revision Y
4E-1351C	Schematic Diagram Diesel Generator 1/2 Auxiliaries & Start Relays	Revision N
4E-1438 Sheet 3	Schematic Diagram RHR System Relay Logic Div-I	Revision AJ
4E-1438J	Schematic Diagram RHR System Motor Operated Valves - Div I	Revision AC
4E-1438L	Schematic Diagram RHR System Motor Operated Valves - Div II	Revision AC
4E-1438P	Schematic Diagram RHR System Service Water Pumps 1-1001-65A, B, C & D 4160 Breaker Control Div I & II, Sheet 14	Revision Y

Drawings

Number	Title	Revision or Date
4E-1438R Sheet 16	Schematic Diagram RHR System Heat Exchanger Valves MO 1-1001-4A, -185A, -186A, -187A Division I	Revision M
4E-1660H	480V SWGR Bus 18 Internal Schematic Diagram Section 184 Compt C & Section 185 Compt B	Revision N
4E-1675F	Wiring and Schematic Diagram Reactor Building Essential Service 480V MCC 18-1B Part 1	Revision AL
4E-1701	Wiring Diagram Main Control Board Panel 901-3	Revision BY
4E-1757A	Wiring Diagram Panel 901-32 Part 1	Revision BD
4E-1757B	Wiring Diagram Panel 901-32 Part 2	Revision AP
4E-2303	Key Diagram 4160V Switchgear 21, 22, 23, 24	Revision L
4E-2350A Sheet 1	Schematic Diagram Engine Control & Generator Excitation Standby Diesel Generator 2	Revision AK
4E-2350A Sheet 2	Schematic Diagram Engine Control & Generator Excitation Standby Diesel Generator 2	Revision AK
4E-2350B Sheet 1	Schematic Diagram Diesel Generator 2 Auxiliaries & Start Relays	Revision AK
4E-2350B Sheet 2	Schematic Diagram Diesel Generator #2 Auxiliaries & Start Relays	Revision AG
4E-2438C Sheet 2	Schematic Diagram RHR System Relay Logic Div I	Revision U
4E-2438E Sheet 2	Schematic Diagram RHR System Relay Logic Div II	Revision V
4E-2438P Sheet 1	Schematic Diagram RHR System Pumps 2-1001-65A, B, C, D 4160V Breaker Control Div I and II	Revision N
4E-2438P Sheet 2	Schematic Diagram RHR System Pumps 2-1001-65A, B, C, D 4160V Breaker Control Div I and II	Revision M
4E-2660H	Internal Schematic Diagrams 480V SWGR 28 Compartments 284C & 285B	Revision F
4E-6830C	Technical Support Center Computer Input Wiring Tabulation (Analog)	Revision U
B-38	Crib House Plan Elev 552'-6"	Revision F
B-56	Intake & Discharge Structure North Area	Revision F
B-700	Turbine Building Condensate Pump Floor Plan	Revision H

Drawings

Number	Title	Revision or Date
M-4A	Environmental Zone Map (Basement Floor Plan) Elevation 554'-0"	Revision D
M-22 Sheet 1	Diagram of Service Water Piping	Revision CU
M-22 Sheet 3	Diagram of Service Water Piping Diesel Generator Cooling Water	Revision P
M-22 Sheet 5	Diagram of Service Water Piping	Revision G
M-37	Diagram of RHR Service Water Piping	Revision AV
M-39 Sheet 3	Diagram of Residual Heat Removal (RHR) Piping	Revision D
M-69 Sheet 1	Diagram of Service Water Piping	Revision CR
M-69 Sheet 3	Diagram of Service Water Piping Diesel Generator Cooling Water	Revision L
M-69 Sheet 5	Diagram of Service Water Piping	Revision E
M-79	Diagram of RHR Service Water Piping	Revision AR
M-81	Diagram of Residual Heat Removal (RHR) Piping	Revision C
M-297	Piping in Substructure Miscellaneous Pans & Sections	Revision L
M-315	Outdoor Piping West Area Below Elev 580'-0"	Revision T
M-725 Sheet 3	Piping & Instrument Diagram Control Room HVAC	Revision M
M-994F	Piping Isometric for Hydraulic Analysis RHR Service Water Loop A	Revision 0
M-998J	Piping Isometric for Hydraulic Analysis Diesel Generator Service Water	Revision 0

Lesson Plans

Number	Title	Revision or Date
LN-6600	Emergency Diesel Generator	Revision 5
LN-1000	Residual Heat Removal System	Revision 7

Miscellaneous Documents

Number	Title	Revision or Date
AT 79047	Operability Determination for Q2001-03159	Revision 1
R-2380	Diesel Engine - Generator Sets	September 21, 1967
Q-92-007-0192-00	Diesel Generator Cooling Water Pump Motor	Revision 1
NEDO-32961	Safety Analysis Report for Quad Cities 1 & 2 Extended Power Uprate (Non-Proprietary)	Revision 1
ANSI/ISA-67.04.01-2000	Setpoints for Nuclear Safety-Related Instrumentation	February 29, 2000
ISA-RP67.04.02-2000	Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation	January 1, 2000
ISA Draft TR67.04.09	Graded Approaches to Setpoint Determination (Draft 5)	September 2000
SS-F-01-0055	ITS Setpoint Change 10CFR50.59 Screening For Facility Change	March 9, 2001
	Maintenance Rule Expert Panel Meeting Minutes - 480V MCC and Lower Voltage Distribution Panels	December 14, 2000
	Inservice Testing Program Third Ten Year Interval	Revision 2
	Inservice Test Hydraulic and Vibration Data for DGCW and RHRSW Pumps (2000 - 2001)	

Procedures

Number	Title	Revision or Date
QCMPM 1500-02	RHR Service Water Vault Submarine Door Preventive Maintenance	Revision 5
QCMPM 4400-11	RHR Service Water Intake Bay Inspection	Revision 4
QCMPM 6600-02	Diesel Engine Thermostatic Valve Inspection CM 6.1.1	Revision 7
QCOA 0010-12	Fire/Explosion	Revision 19
QCOA 0010-14	Failure of Lock and Dam #14	Revision 5
QCOA 1000-02	Loss of Shutdown Cooling	Revision 12
QCOA 1000-04	LPCI Automatic Initiation	Revision 10
QCOA 1000-07	Loss of 125 VDC Control Power to RHR Channel 1(2)A Initiation Logic	Revision 7

Procedures

Number	Title	Revision or Date
QCOA 1000-08	Loss of 125 VDC Control Power to RHR Channel 1(2)B Initiation Logic	Revision 6
QCOA 6100-03	Loss of Offsite Power	Revision 12
QCOA 6100-04	Station Blackout	Revision 8
QCOA 6600-11	Loss of Normal Power Feed to the Diesel Generator 1(2) Cooling Water Pump and Cubicle Coolers A & B	Revision 7
QCOA 6600-14	Loss of a Diesel Generator Cooling Water Pump	Revision 11
QCOP 1000-04	RHR Service Water System Operation	Revision 14
QCOP 1000-05	Shutdown Cooling Operation	Revision 28
QCOP 1000-07	Torus Water Cooling with Control Room Inaccessible	Revision 9
QCOP 1000-09	Torus Cooling Start Up and Operation	Revision 14
QCOP 1000-15	RHR Service Water Operation using Loop A Cross-Tie Header	Revision 11
QCOP 1000-16	RHR Service Water Vault Sump Pumps Operation	Revision 0
QCOP 1000-20	RHR Service Water Operation using Loop A Cross-Tie Header	Revision 13
QCOP 1000-30	Post-Accident RHR Operation	Revision 14
QCOP 1000-31	RHR Service Water Pump Venting	Revision 10
QCOP 6600-01	Diesel Generator 1(2) Preparation for Standby Operation	Revision 25
QCOP 6600-04	Diesel Generator 1(2) Preparation for Standby Operation	Revision 19
QCOP 6600-05	Diesel Generator 1/2 Start Up	Revision 21
QCOP 6600-06	Diesel Generator 1/2 Shut Down	Revision 17
QCOP 6600-13	Diesel Generator 1/2 Out of Service	Revision 4
QCOP 6600-14	Emergency Diesel Generator Cooling Water Pump Manual Operation	Revision 3
QCOP 6600-15	1/2 Diesel Generator Cooling Water Pump Cross Connect Alignment	Revision 5
QCOS 1000-04	RHR Service Water Pump Operability Test	Revision 28
QCOS 1000-13	RHR Service Water Flush of Loop B for Appendix R	Revision 12

Procedures

Number	Title	Revision or Date
QCOS 1000-19	RHR Service Water Flush of Loop A for Appendix R	Revision 11
QCOS 1000-20	RHR/RHR Service Water Pump Breaker Local Control Test for Appendix R	Revision 9
QCOS 1000-28	RHR Service Water Pump Performance Test	Revision 7
QCOS 1000-29	RHR Heat Exchanger Thermal Performance Test	Revision 6
QCOS 6600-04	Diesel Generator Heat Exchanger Flow Reversal	Revision 10
QCOS 6600-06	Diesel Generator Cooling Water Pump Flow Rate Test	Revision 20
QCOS 6600-08	1/2 Diesel Generator Cooling Water to Unit 1 and Unit 2 ECCS Room Coolers Flow Test	Revision 16
QCOS 6600-17	Operating Cycle Diesel Cooling Water Pump Alternate Power Feed Test for Appendix R	Revision 11
QCOS 6600-28	Diesel Generator Cooling Water Pump Operability Test with ECCS Room Coolers Isolated	Revision 4
QCTP 0820-10	Heat Exchanger and Room Cooler Inspection	Revision 2
QCTS 0820-01	Leak Test of RHR Service Water Vault Flood Protection Penetrations	Revision 7
QCTS 0820-14	Evaluation of RHRSW Vault Flood Protection Leakage Test Results	Revision 1
QOA 6700-04	480V Bus 18(28) Failure	Revision 16
QOA 6700-05	480V Bus 19(29) Failure	Revision 13
QOP 6700-02	480 Volts Bus Tie Circuit Breakers	Revision 19

Surveillances (completed)

Number	Title	Date performed
QCOADS0100-19	Quad Cities OAD Undervoltage Relay Calibration Bus 13-1	April 16, 2001
QCOADS0100-20	Quad Cities OAD Undervoltage Relay Calibration Bus 14-1	April 23, 2001
QCOS 1000-04	RHR Service Water Pump Operability Test	November 21, 2001
QCOS 1000-04	RHR Service Water Pump Operability Test	December 7, 2001
QCOS 1000-04	RHR Service Water Pump Operability Test	December 28 2001

Surveillances (completed)

Number	Title	Date performed
QCOS 1000-04	RHR Service Water Pump Operability Test	January 18, 2002
QCOS 6600-06	Diesel Generator Cooling Water Pump Flow Rate Test	October 23, 2001
QCOS 6600-06	Diesel Generator Cooling Water Pump Flow Rate Test	November 15, 2001
QCOS 6600-06	Diesel Generator Cooling Water Pump Flow Rate Test	December 6, 2001

Technical Specifications

Number	Title	Revision or Date
3.3.8.1	Loss of Power (LOP) Instrumentation	Revision 199/195
3.7.1	Residual Heat Removal Service Water (RHRSW) System	Revision 199/195
3.7.2	Diesel Generator Cooling Water (DGCW) System	Revision 199/195
B 3.7.1	Residual Heat Removal Service Water (RHRSW) System	Revision 199/195
B 3.7.2	Diesel Generator Cooling Water (DGCW) System	Revision 199/195

Updated Final Safety Analysis Report Sections

Number	Title	Revision or Date
Section 3.4.1.2.1.2	Isolation of the RHR Service Water Pumps and the Diesel Generator Cooling Water Pumps from Flood Water	Revision 6
Section 8.3.1.2	4160V Systems	Revision 6
Section 8.3.1.4	480V Systems	Revision 6
Section 8.3.2.2	125VDC Systems	Revision 6
Section 9.2.1	Residual Heat Removal Service Water Subsystem	Revision 6
Section 9.2.5	Ultimate Heat Sink	Revision 6
Section 9.5.5	Diesel Generator Cooling Water System	Revision 6

Work Orders

Number	Title	Revision or Date
99243411	Diesel Generator Cooling Water Pump Flow Instrument Calibration	December 14, 2001
00377999	Change Setpoint on Unit 1 DGCWP Motor 1-3903 (Bus 19 Cub 6A)	January 4, 2002
00378048	Change Setpoint on Unit 2 DGCWP Feed Brkr Bus 29 Cub 6A	January 11, 2002
00378052	Change Setpoint on Unit 1/2 DGCWP Feed Brkr Bus 18 Cub 4C	January 24, 2002
00378054	Change Unit 2 Feed Brk (Bus 28 Cub 4C) Setpoint for 1/2 DGCWP	January 24, 2002