



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, ILLINOIS 60532-4352

January 12, 2018

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2– NRC
DESIGN BASES ASSURANCE INSPECTION (TEAMS): INSPECTION
REPORT 05000254/2017007; 05000265/2017007

Dear Mr. Hansen:

On December 28, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a Triennial Baseline Design Bases Assurance Inspection (Teams) at your Quad Cities Nuclear Power Station. The enclosed report documents the results of this inspection, which were discussed on December 28, 2018, with Mr. Humphrey, and other members of your staff.

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

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Mark T. Jeffers, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50–254, 50–265
License Nos. DPR–29; DPR–30

Enclosure:
IR 05000254/2017007; 05000265/2017007

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Letter to Bryan C. Hanson from Mark T. Jeffers dated January 12, 2018

SUBJECT: QUAD CITIES NUCLEAR GENERATING PLANT—NRC DESIGN
BASES ASSURANCE INSPECTION (PROGRAMS): INSPECTION
REPORT 05000254/2017007; 05000265/2017007

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-254; 50-265
License No: DPR-29; DPR-30

Report No: 05000254/2017007; 05000265/2017007

Licensee: Exelon Generating

Facility: Quad Cities Nuclear Power Station

Location: Cordova, IL

Dates: November 13-December 28, 2017

Inspectors: M. Jones, Engineering Inspector, Lead
A. Dunlop, Senior Engineering Inspector, Mechanical
I. Hafeez, Engineering Inspector, Electrical
D. Betancourt, Operations Inspector
H. Leake, Electrical Contractor
W. Sherbin, Mechanical Contractor

Approved by: M. Jeffers, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY

Inspection Report 05000254/2017007; 05000265/2017007, 11/13/2017–12/01/2017; Quad Cities Nuclear Power Station; Design Bases Assurance Inspection (Teams).

The inspection was a 2-week onsite baseline inspection that focused on the design of components. The inspection was conducted by regional engineering inspectors and two consultants. No findings of significance were identified by the inspectors. The U.S. Nuclear Regulatory Commission's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6, dated July 2016.

NRC-Identified and Self-Revealed Findings

No findings were identified during this inspection.

Licensee-Identified Violations

No findings were identified during this inspection.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Design Bases Assurance Inspection (Teams) (71111.21M)

.1 Introduction

The objective of the Design Bases Assurance Inspection is to verify that design bases have been correctly implemented for the selected risk significant components, modifications, and that operating procedures and operator actions are consistent with design and licensing bases. As plants age, their design bases may be difficult to determine and an important design feature may be altered or disabled during a modification. The inspection also monitors the implementation of modifications to structures, systems, and components as modifications to one system may also affect the design bases and functioning of interfacing systems as well as introduce the potential for common cause failures. The Probabilistic Risk Assessment (PRA) model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectable area verifies aspects of the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for which there are no indicators to measure performance.

Specific documents reviewed during the inspection are listed in the Attachment to the report.

.2 Inspection Sample Selection Process

The inspectors selected risk-significant components and operator actions for review using information contained in the licensee's PRA and the Quad Cities Nuclear Power Station Standardized Plant Analysis Risk Model. In general, the selection was based upon the components and operator actions having a risk achievement worth of greater than 1.3 and/or a risk reduction worth greater than 1.005. Based on this process, a number of risk-significant components, including those with Large Early Release Frequency implications, were selected for the inspection. The operator actions or operating procedures selected for review included actions taken by operators both inside and outside of the control room during postulated accident scenarios associated with the selected components.

The inspectors performed a margin assessment and detailed review of the selected risk-significant components to verify that the design bases have been correctly implemented and maintained. This design margin assessment considered original design reductions caused by design modification, or power uprates, or reductions due to degraded material condition. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as performance test results, significant corrective action, repeated maintenance activities, Maintenance Rule (a)(1) status, components requiring an operability evaluation, system health reports, and U.S. Nuclear Regulatory Commission (NRC) resident inspector input of problem areas/equipment. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in depth margins. A summary of the reviews performed and are included in the following sections of the report.

The inspectors also identified modifications to mitigating systems for review. In addition, the inspectors selected procedures and operating experience issues associated with the selected components.

This inspection constituted 11 samples (5 components, with 1 component associated with Large Early Release Frequency implications, 4 modifications, and 2 operating experience) as defined in Inspection Procedure 71111.21M-02.01.

.3 Component Design

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), Technical Specifications, design basis documents, drawings, calculations and other available design basis information, to determine the performance requirements of the selected components. The inspectors used applicable industry standards, such as the American Society of Mechanical Engineers Code, Institute of Electrical and Electronics Engineers Standards, and the National Electric Code, to evaluate acceptability of the systems' design. The NRC also evaluated licensee actions, if any, taken in response to NRC issued operating experience, such as Bulletins, Generic Letters, Regulatory Issue Summaries, and Information Notices. The review was to verify that the selected components would function as designed when required and support proper operation of the associated systems. The attributes that were needed for a component to perform its required function included process medium, energy sources, control systems, operator actions, and heat removal. The attributes to verify that the component condition and tested capability was consistent with the design bases and was appropriate may include installed configuration, system operation, detailed design, system testing, equipment and environmental qualification, equipment protection, component inputs and outputs, operating experience, and component degradation.

For each of the components selected, the inspectors reviewed the maintenance history, preventive maintenance activities, system health reports, operating experience-related information, vendor manuals, electrical and mechanical drawings, and licensee corrective action program documents. Field walkdowns were conducted for all accessible components to assess material condition, including age-related degradation and to verify that the as-built condition was consistent with the design. Other attributes reviewed are included as part of the scope for each individual component.

The following five components (samples), including a component with Large Early Release Frequency were reviewed:

- Unit 1/2 Reactor Building Closed Cooling Water Pump (1/2-3701): The team inspected the performance of reactor building closed cooling water (RBCCW) pump 1/2-3701 and the associated potential impact on plant operations (failure of the pumps could lead to a plant transient). The inspection included interviews with system and design engineers and operators, system walkdowns; and reviews of drawings, and normal, alarm response, and abnormal plant procedures. This review focused on the RBCCW system's response to a postulated automatic initiation of stand-by pump 1/2-3701 due to a discharge header low-pressure signal; and operator actions following this initiation. The team reviewed plant procedures to determine whether the operator actions were acceptable to assure reliable operation of the RBCCW system. Additionally, the

inspectors reviewed electrical drawings, including one-lines and schematics to verify consistency with UFSAR descriptions and engineering analyses. Loading and voltage calculations were reviewed for pump operation on both offsite and onsite power sources (emergency diesel generators) to verify the adequacy of the motor power supplies. Finally, the team reviewed condition reports, maintenance history, and system health reports to determine the overall health of the pump, and to determine if issues entered into the Corrective Action Program were properly addressed.

- Unit 1/2 Emergency Diesel Generator (EDG) Ventilation Fan (1/2-5727): The team reviewed the calculations related to EDG room supply air ventilation requirements, and compared the calculated airflow requirements with fan test data to ensure adequate heat removal capability. The team reviewed failure positions of pneumatic louver operators in the ventilation enclosures to ensure louvers will open on a loss of instrument air. The team also reviewed the control and wiring diagrams for the starting and stopping of the ventilation fan. Preventive maintenance activities for lubricating the ventilation exhaust fan motor and fan shaft bearings were also reviewed to ensure vendor recommended preventive maintenance activities were being performed. The inspection included interviews with system and design engineers and operators, system walkdowns; and reviews of drawings, and alarm response procedures.
- 125 Vdc Distribution Panels: The team reviewed load flow calculations to determine whether the panels were applied within their required current ratings. The team reviewed voltage drop calculations to determine whether loads had their required minimum voltage and whether they were applied within their maximum voltage rating during battery equalizing. The team reviewed short circuit and protective device calculations to determine whether equipment was adequately protected and immune from spurious tripping. The team reviewed maintenance schedules, procedures, and maintenance records, including circuit breaker test requirements, to determine whether the panels and their associated circuit breakers were being properly maintained. In addition, the team performed a visual inspection of the 125Vdc Distribution Panels to assess material condition and the presence of hazards.
- Alternating Current (AC) Bus Supplying Power to Residual Heat Removal (RHR) Pumps 1A and 1B (4160V Switchgear 13-1): The team reviewed one-line diagrams, drawings, calculations of loading, short circuit, voltage drop, and protective relay trip setpoints to verify the capability of the switchgear to adequately supply the essential loads when powered by the unit auxiliary transformer, reserve auxiliary transformer, or EDG. The team also verified the maximum short circuit current available at the bus was within the interrupting capacity of the feeder breakers. The team reviewed the fast transfer design of the switchgear from the unit auxiliary transformer (main generator source) to the reserve auxiliary transformer (offsite power source) when the main generator trips. The team verified the feeder cable size and ampacity for the RHR pumps was adequate to carry the maximum load current. Administrative controls were reviewed for mitigating potential conductor and EDG overload conditions identified in the load flow and EDG sizing calculations. The inspectors performed a walkdown of 4160V Switchgear 13-1 to observe its material condition.
- Main Steam Isolation Valves (MSIV) (1-203-001(A-D), 1-203-002(A-D)): The team reviewed the design basis of the inboard and outboard MSIVs for Unit 1, the basis for its closure time requirement, and the associated control logic. The

team reviewed operating procedures associated with the MSIVs under normal and accident conditions. The air accumulator leakage limits, leak test procedures, air quality, and recent test results were reviewed to verify acceptance criteria were met and performance degradation would be identified. The team reviewed closure time surveillance procedures and recent results to verify that the test results were representative of the most limiting postulated accident conditions. The (a)(1) action plan for the MSIV timing issues was reviewed to verify the cause(s) were identified and corrective actions were planned or implemented to resolve the timing issue. The team reviewed the testing of the control circuits required to close the MSIVs to ensure that the testing was comprehensive.

.4 Findings

No findings were identified.

.5 Mitigating System Modifications

a. Inspection Scope

The team reviewed 4 permanent plant modifications to mitigating systems that had been installed in the plant during the last 3 years. This review included in-plant walkdowns for portions of the modified Unit 1/2 EDG ventilation fan, 1B RHR pump seal Cooler, 4160V switchgear bus 13-1, 125 Vdc distribution panels, and 125 Vdc normal and alternate batteries. The team reviewed the modifications to verify that the design bases, licensing bases, and performance capability of the components had not been degraded through modifications. The modifications were selected based upon risk significance, safety significance, and complexity. The inspectors reviewed the modifications selected to determine if:

- the supporting design and licensing basis documentation was updated;
- the changes were in accordance with the specified design requirements;
- the procedures and training plans affected by the modification have been adequately updated;
- the test documentation as required by the applicable test programs has been updated; and
- post-modification testing adequately verified system operability and/or functionality.

The team also used applicable industry standards to evaluate acceptability of the modifications. The modifications listed below were reviewed as part of this inspection effort:

- Engineering Change (EC) 398602, "Replace the 1B RHR Pump Seal Cooler;"
- EC 395167, "Install Close Torque Switch Bypass Mod in 1-1001-29A to Increase Margin;"
- EC 398044 Revision 1, "Unit 1 4kv Bus Transfer Logic Modification for an Open Phase Event Concurrent with a LOCA;" and
- EC 932979, "U1 250 VDC MCC Cubicle Bucket Replacement."

b. Findings

No findings were identified.

.6 Operating Experience

a. Inspection Scope

The inspectors reviewed 2 operating experience issues (samples) to ensure that NRC generic concerns had been adequately evaluated and addressed by the licensee. The operating experience issues listed below were reviewed as part of this inspection:

- Information Notice 2015-13, "Main Steam Isolation Valve Failure Events;" and
- Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power."

b. Findings

No findings were identified.

.7 Operating Procedure Accident Scenarios

a. Inspection Scope

The team performed a detailed review of selected procedures associated with the inspections component samples. For the procedures listed time critical operator actions were reviewed for reasonableness, in plant action were walked down with a licensed operator, and any interfaces with other departments were evaluated. The procedures were compared to UFSAR, design assumptions, and training materials to assess their consistency. In addition, operator actions were observed at the station's simulator for two scenarios: Anticipated Transient with a Scram, and Loss of AC to the 125 Volt Direct Current Battery Chargers with a simultaneous loss of auxiliary electrical Power.

The following operating procedures were reviewed in detail:

- QGA 101, "Reactor Pressure Vessel Control (ATWS);"
- QCOA 6900-07, "Loss of AC Power to 125 VDC Battery Charger with Simultaneous Loss of Auxiliary Electrical Power;"
- QCOP 3700-02, "RBCCW System Startup and Operation;"
- QCOA 3700-06, "RBCCW Line Break Inside Containment;"
- QCOP 1000-30, "Post Accident RHR Operation;" and
- QGOA 6100-03, "Loss of Offsite Power."

The inspectors performed a margin assessment and detailed review of four risk-significant and/or time critical operator actions. These actions were selected from the licensee's PRA rankings of human action importance based on risk achievement worth values, and where possible, margins were determined by the review of the assumed design basis and UFSAR response times and performance times documented by job performance measures results. For the selected operator actions, the inspectors performed a detailed review and walk through of associated procedures, including observing the performance of some actions in the station's simulator and in the plant for

other actions, with an appropriate plant operator to assess operator knowledge level, adequacy of procedures, and availability of special equipment where required.

The following operator actions were reviewed:

- Initiation of Torus Cooling during Appendix R scenarios;
- Manual Start of RHR Containment Cooling Mode of RHR;
- Initiate Drywell Spray during an Anticipate Transient without Scram; and
- Load Shed 125 VDC Loads following loss of AC Power.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Review of Items Entered Into the Corrective Action Program

a. Inspection Scope

The team reviewed a sample of the selected component problems identified by the licensee and entered into the corrective action program. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design issues. In addition, corrective action documents written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the Corrective Action Program. The specific corrective action documents sampled and reviewed by the inspectors are listed in the attachment to this report.

The team also selected two issues identified during previous Component Design Basis Inspections to verify that the concern was adequately evaluated and corrective actions were identified and implemented to resolve the concern, as necessary. The following issues were reviewed:

- Non-Cited Violation 5000254/265/2011009-02; Failure to Perform Required In-Service Testing of Shutdown Cooling Suction Valves; and
- Non-Cited Violation 05000254/2016008-01, "Failure to Provide Appropriate Operating Instructions for Aligning a Battery Charger to the Station Black-Out Diesel Generator."

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Interim Exit Meeting Summary

On December 1, 2017, the inspectors presented the inspection results to Mr. Kenneth S. Ohr, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. Any documents reviewed by the inspectors that were considered proprietary information were either returned to the licensee or handled in accordance with NRC policy on proprietary information. The team had outstanding questions that required additional review and a following exit meeting.

.2 Exit Meeting Summary

On December 28, 2017, the team presented the inspection results to Mr. M. Humphrey and other members of the licensee staff. The licensee acknowledged the issues presented. The team asked the licensee whether any materials examined during the inspection should be considered proprietary. Several documents reviewed by the team were considered proprietary information and were either returned to the licensee or handled in accordance with NRC policy on proprietary information.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Ohr, Site Vice President
M. Humphrey, Regulatory Assurance
R. Swart, Engineering Supervisor
T. Bell, Engineering Director
J. Bries, Operations Director
J. Cox, Operations Supervisor

U.S. Nuclear Regulatory Commission

R. Murray, Senior Resident Inspector
K. Carrington, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened, Closed and Discussed

None

LIST OF ACRONYMS USED

AC	Alternating Current
EC	Engineering Change
EDG	Emergency Diesel Generator
MSIV	Main Steam Isolation Valve
NRC	U.S. Nuclear Regulatory Commission
PRA	Probabilistic Risk Assessment
RBCCW	Reactor Building Closed Cooling Water
UFSAR	Updated Final Safety Analysis Report

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

CALCULATIONS

Number	Description or Title	Revision
5570-31-19-1	125 VDC Fault Currents	8
AOV-MEDP-QDC-RX-001	Inboard Main Steam Isolation Valve D/P Calc	0
AOV-MEDP-QDC-RX-003	Outboard Main Steam Isolation Valve D/P Calc	0
MPED-9391-01-001	MSIV Actuator Leakage and Accumulator Pressure Change	0
OPTIMA2-TR026QC-ATWS	ATWS Analysis for the Introduction of SVEA-96 Optima2 Fuel at Quad Cities Units 1 & 2	1
QDC-0203-M-0968	Main Steam Isolation Valves Sizing Calculation	1
QDC-1000-S-2047	Flow Serve Seismic Report SR-1476 for RHR Pump Seal Cooler	0A
QDC-6600-E-2037	Emergency Diesel Generator Technical Specification Allowed Voltage & Frequency Range Analyses	1
QDC-6700-E-0939	Loss of Voltage Relay Setpoint for Buses 13-1, 14-1, 23-1, and 24-1	1
QDC-6700-E-1498	Second Level Undervoltage Relay Setpoint	10
QDC-6700-E-1503	Analysis of Load Flow, Short Circuit and Motor Starting using ETAP PowerStation	10
QDC-6700-E-2116	Protective Relay Setting Calculation for 4kV Switchgear 13, 14, 13-1, and 14-1	10
QDC-6700-E-2119	Quad Cities Open Phase Detection LOCA Analysis	0
QDC-8300-E-0482	Evaluation of 125VDC System Coordination for Appendix R	9
QDC-3700-M-1324	RBCCW System Combined DBD and dp Calculation	0A
QDC-5700-H-1567	DG Room Ventilation	3
DRE06-0023	Diesel Generator Room Ventilation (Dresden Station)	2

CORRECTIVE ACTION DOCUMENTS GENERATED DUE TO THE INSPECTION

Number	Description or Title	Date
4075556	DBAI Local Light Indication not lit MO-2-1001-23B	11/16/2017
4075558	DBAI Local Light Indication not lit MO-2-1001-26B	11/16/2017
4078813	Overdutied 125VDC Breakers When Batteries are Paralleled	11/27/2017
4078819	MSIV Vendor Drawing Not Updated in Timely Manner	11/29/2017
4078990	QCTS 4700-01 Procedure Reference Correction	11/29/2017
4079561	DBAI Fast Bus Transfer Analysis Documentation Gap	11/30/2017
4079575	DBAI ETAP Calc Potential Non-Conservatism & Quality Issue	11/30/2017

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
276519	State Estimator Program Transformer Models for Quad Cities	11/24/2004
351883	125 VDC Battery Loading	07/11/2005
689559	Discrepancy in Flow Data in OP Eval	10/25/2007
822508	CDBI-Seismic Issue with 250VDC & U2 Alt 125VDC Battery	04/09/2010
1233693	Lack of Fast Bus Transfer Analysis of 4kV Buses—OPEX	06/28/2011
1279066	CDBI - Reclassification of SDC Suction Valve for IST	10/20/2011
1288784	CDBI—Technical Specification Limits for EDG	11/10/2011
1294758	Relay Chatter on the 1-0590-102G Relay	11/27/2011
1360634	1A RHR Pump Breaker Degraded	04/30/2012
1365523	Merlin Gerin Breaker Failure Analysis Report—OE	05/11/2012
1385451	Determine 1/2 EDG Vent Fan Motor Nameplate Data	03/16/2015
1407778	1-590-102H MSIV 203-1D 2D Closure Scram Signal Relay Chatter	08/31/2012
1425227	RBCCW Expansion Tanks Not Equal Level (1-3703)	10/11/2012
1431869	OIO – Benchmarking for Validation of the Time Critical Actions	10/26/2012
1448655	Inability to Meet Time Critical Actions	11/30/2012
1452402	1D MSIV Relay 1-0595-149D Failed PMT, WO 1595343-02	12/14/2012
1462317	Dresden IRS1417005, 1443849. Slow Close of 2 Merlin Gerin Bkrs	01/14/2013
1485944	QCOS 0250-04 MSIV Closure Time Failed As-Found	03/11/2013
1486745	Q1R22 - LLRT INBD MSIV "A" Leakage = 85.358 SCFH	03/12/2013
1488540	1-0203-1A MSIV Wave Spring Found Damaged	03/16/2013
1493074	Q1R22 - 1B MSIV Limit Switch JB does Not Appear Secured	03/27/2013
1502238	EDG Freq and Volt TS Tolerance	08/31/2016
1506215	MRule: Performance Criteria Exceeded (Main Steam Valves)	04/24/2013
1667947	RBCCW Expansion Tank Level Increasing 2"/Day On Both Units (1-3703)	06/04/2014
1669130	RBCCW Expansion Tank Level - Follow Up To IR 1667947 (1-3703)	06/08/2014
2462135	Q1R23 - INBD MSIV 1-0203-1A Exceeded TS Limit	03/02/2015
2465362	MSIV 2A Limit Switch 2B does not Operate Smoothly	03/09/2015
2487426	QCOA 6100-17 Procedures Issues	04/18/2015
2529943	1D MSIV Inboard Open Indication Sparked During Bulb Change	07/18/2015
2582864	Protective Relay Setting Enhancements Recommended	11/05/2015
2600694	Information Notice 2015-13 Review	02/03/2016
2668424	1/2 RBCCW Pump has 3 dpm Leak (0-3701)	05/12/2016
2682090	Trending 1/2 RBCCW Pump Leak: 6 dpm (0-3701)	06/16/2016
2706435	Mod's 50.59 Audit Identified a QCOA 6100-17 Revision Issue	08/19/2016

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
2732501	1A Charger has a step Change in AC Ripple Volts	10/25/2016
3986139	Transformer 22 Load Tap Changer	03/17/2017
3990038	MSIV As-Found Closure Timing Out of Band	03/27/2017
3990758	Q1R24 2C Outboard MSIV Found Outside of 9.8%	03/29/2017
3991086	Q1R24 1A MSIV PMT Leakage Exceeds TS Limit	03/29/2017
3994355	Q1R24 Potential FME Concerns with MSIV Air Manifolds	04/05/2017
4002511	MRULE A1Determination Required for MSIVS RX0203-01	04/25/2017
4017529	NRC Concerns Associated with 1-0203-2D MSIV Actuator	06/01/2017
4031723	Perform ECAP (DG Ventilation)	08/18/2017
4036345	NOS ID: Incomplete Revision of EC392979DCS	7/27/2017
4065257	Corporate DC SME: OPEX for Battery Thermal Aging	10/20/2017
4066450	U1 1A 125V DC Battery Charger Amperage Oscillations	10/24/2017
4074482	OPEX Review 4061005 Finds in 2017-06 is Applicable to QDC	11/14/2017

DRAWINGS

Number	Description or Title	Revision
4E-1301 Sh. 3	Single Line Diagram	AM
4E-1303	Key Diagram, 4160V Switchgear 11, 12, 13, and 14	Y
4E-1304	Key Diagram, 4160V Switchgears 13-1 and 14-1	AJ
4E-1306	Key Diagram, Reactor Building 480V SW Groups 18 and 19	AC
4E-1328	Single Line Diagram, Emergency Power System	F
4E-1334	Relaying and Metering Diagram: 4160V Switchgear Buses 13-1 and 14-1	AJ
4E-1338	Schematic Diagram, Generator and Transformer Tripping Relays	AX
4E-1343	Schematic Control Diagram, 4160V Bus 14 Main and Reserve Feed Gas Circuit Breakers	AB
4E-1349 Sh. 1	Schematic Diagram, 480V Transformer 18 and 19 and Bus 18 and 19 Main Breakers	X
4E-1349 Sh. 2	Schematic Diagram, 480V Transformer 18 and 19 and Bus 18 and 19 Main Breakers	X
4E-1349 Sh. 3	Schematic Diagram, 480V Trans 18 and 19 and Buses 18 and 19 Main Breakers	Z
4E-1351B	Schematic Dia. DG Aux. and Start Relays	Y
4E-1397	Schematic Control Diagram, Reactor Building Cooling Water Pumps	0
4E-1430 Sh. 1	Schematic Diagram, Core Spray Systems I and II	BN
4E-1430 Sh. 2	Schematic Diagram, Core Spray Systems I and II	BD
4E-1685D	Wiring Diagram Turbine Building 125V DC Main Bus DIST. PNL.	U
4E-1814F	Wiring Dia. DG 1/2 Panel	I
4E-2318B	Overall Key Diagram 125V DC Distribution Centers	D
4E-2685C	Schematic Diagram Turbine Building 125VDC Main Bus 2 and 2A	R
4E-6505A	Cable Tabulation Cables 67200 to 67249	S
DR-34289	20 Inch Y Pattern Globe Valve Pilot Operated to Open Spring to Close Original Welded Liner	4
FF-11395	Final Assy. Series 1000 Fans Internal Direct Drive	386
M-33	Diagram of RBCCW Closed Cooling Water Piping	AS
M-813	Diagram of DG Room Ventilation System	F

MISCELLANEOUS

Number	Description or Title	Date or Revision
	MS / RX (MNS - Main Steam) System Health Report	10/26/2017
	Letter from Commonwealth Edison to USNRC, Request for Amendment to Facility Operating Licenses DPR-29 and DPR-30, Appendix A, Technical Specification (TS), Section 4.9.8.b, Clarification of Diesel Generator Single Load Rejection Test Surveillance Requirements	05/01/1997
	Letter from USNRC to Commonwealth Edison Company, Issuance of Amendments	10/07/19/97
	Letter from AmerGen/Exelon Nuclear to USNRC, EGC/AmerGen 60-Day Response to NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"	04/03/2006
	Letter from AmerGen/Exelon Nuclear to USNRC, EGC/AmerGen 60-Day Response to the Request for Additional Information Regarding Resolution of NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"	01/31/2007
	Letter from USNRC to Exelon Generation Company/AmerGen Energy Company, Responses to Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"	05/07/2007
	Validation Package for TSA 2: 125 VDC Load Shed	11/20/2015
	Validation Package for TCA 13: Initiate DW Sprays during an ATWS with > 2.5 psig DW on DW Temperature > 2810F	12/12/2013
	Validation Package for TCA 9: Manual Start of RHR Containment Cooling Mode for DBA	10/03/2016
	Validation Package for TCA 6: Initiate Torus Cooling	05/11/2015
	RCC / TCC (CCW - Closed Cooling Water) Sys. Health Report	1Q/2017
	(EDG - Diesel Generator, EDG Vent) Sys. Health Report	3Q/2017
	Letter from NRC to Exelon Generation; Quad Cities-Completion of Licensing Action for Generic Letter 96-06	05/08/2002
00473026	PSI Quarterly Instrument Air – Performed 9/5/17	09/06/2017
C0005	GNB Flooded Classic Batteries	1
EC 354336	Determine 345 kV Minimum Switchyard Voltage that May be Used for Various Plant Configurations	03/28/2005
EC 371739	EMD Engine Cold Load Derate Evaluation	08/05/08
EC 399724	Provide New State Estimator Setpoints Based on Percent Voltage Drop	11/09/2014
IST-QDC-BDOC-V-19	Quad Cities IST Bases Document	09/09/2016
NDIT 98-092	RHR/CS/RHRSW Pump BHP Input Values for Diesel Generator Loading Calculations	03/19/1998
NO-AA-10	Quality Assurance Topical Report (QATR)	92
SPOG: 1-1	System Planning Operating Guide, Generation Stations Voltage Level	22

MODIFICATIONS

Number	Description or Title	Date or Revision
EC 385681	Operator Manual Action Feasibility Study	0
EC 23169	Install New Breakers at Bus 13-1	05/09/1997
EC 24157	Bus 18 Lighting Breaker Operator Work Around—CREVS	09/07/2001
EC 391678	Replace Existing MSIV Angled Disc with Machined Spherical Main Disc to Reduce Leakage	1
EC 395167	Install Close Torque Switch Bypass Mod in 1-1001-29A to Increase Margin	0
EC 398044	Unit 1 4kv Bus Transfer Logic Modification for an Open Phase Event Concurrent with a LOCA	1
EC 398602	Replace the 1B RHR Pump Seal Cooler	2
EC-392979	U1 250 VDC MCC Cubicle Bucket Replacement	0
M04-2-88-043A,B,C	125V Battery Installation Unit 2	04/24/1989

OPERABILITY EVALUATIONS

Number	Description or Title	Date
4017529	Main Steam Isolation Valve 1-0203-2D	0
4050287	Main Steam Isolation Valves 1(2)-0203-2A,2B,2C,2D	0

PROCEDURES

Number	Description or Title	Revision
CC-AA-309	Control of Design Analyses	11
OP-AA-102-106	Operator Response Time Program	4
OP-AA-108-107-1001	Station Response to Grid Capacity Conditions	7
OP-AA-108-107-1002	Interface Agreement between Exelon Energy Delivery and Exelon Generation for Switchyard Operations	11
OP-QC-102-106	Operator Response Time Program at Quad Cities	7
OP-QC-102-106	Operator Response Time at Quad Cities	0
OP-QC-103-102-1002	Quad Cities Strategies for Successful Transient Mitigation	21
QAP 0300-02	Conduct of Shift Operations	78
QAP 0300-03	Operations Shift Staffing	41
QC0A-6100-01	Loss of Reserve Auxiliary Transformer 12(22) During Power Operations	33
QCAN 901-8 E-6	4KV Bus 14-1 Voltage Unbalanced	4
QCAN 912-1	Reactor Building Cooling Water Low Pressure"	10
QCAN 912-1 C-1	Reactor Building Cooling Water Pump Trip	2
QCAN 912-1 F-1	Reactor Building Cooling Water Expansion Tank Hi/Lo Level	6
QCAN 912-7 A-6	Unit 1 Drywell / Outboard MSIV Room High Temp	6
QCARP 0020-02	Injection with SSMP and Bringing the Unit to Cold Shutdown	20
QCARP 0020-02	RRB-2N Injection with SSMP and Bringing the Unit to Cold Shutdown	20
QCEMS 0230-03	Unit 2 125VDC Service Test on Normal Batteries	06
QCOA 0250-02	MSIV Failure	17

PROCEDURES

Number	Description or Title	Revision
QCOA 3700-06	RBCCW Line Break Inside Containment	8
QCOA 6000-03	Low Switchyard Voltage	19
QCOA 6100-03	Loss of Offsite Power	42
QCOA 6600-06	1/2 Diesel Generator Room Vent Fan Failure	12
QCOA 6900-07	Loss of A.C. Power to the 125 VDC Battery Chargers with Simultaneous Loss of Auxiliary Electrical Power	24
QCOA-6100-03	Loss of Offsite Power	42
QCOP 0201-16	Terminate and Prevent RPV Injection	7
QCOP 0250-03	Main Steam Line	16
QCOP 1000-30	Post-Accident RHR Operation	31
QCOP 3700-02	RBCCW System Startup And Operation	29
QCOP 4400-02	Circulating Water System Startup and Shutdown	37
QCOP 5750-19	Drywell Cooler Operation	11
QCOP 6500-08	4kV Bus Cross-Tie Operation	30
QCOP 6500-09	Energizing 4KV Switchgear and Transferring Auxiliary Power	20
QCOP 6500-29	Reserve Auxiliary Transformer 12 (22) Load Tap Changer Operation	22
QCOP 6600-05	Shared Unit Diesel Generator Start Up	38
QCOP 6900-224	Transfer of Unit Two 125VDC Bus Between Normal and Alternate Battery	24
QCOP 6900-25	Transfer of Unit One 125VDC Bus Between Normal and Alternate Battery	25
QCOP 6900-40	Unit 1 125 VDC Electrical System	2
QCOS 0005-08	Unit One Electrical Distribution Breaker and Voltage Verification	40
QCOS 0020-02	Safety System Monthly Manual Valve Position Verification	19
QCOS 1000-26	RHR Valve Position Verification	23
QCTS 4700-01	Instrument Air Analysis	6
QGA 100	RPV Control	11
QGA 101	RPV Control (ATWS)	15
QGA 200	Primary Containment Control	11
QOA 6100-01	Loss of Reserve Auxiliary Transformer 12 (22) During Power Operation	33
QOA 6900-07	Loss of AC Power to the 125VDC Battery Chargers with Simultaneous Loss of Auxiliary Electrical Power	24
QOM 1-1000-02	Unit 1 RHR Valve Checklist (North RHR Room)	14
WC-QC-8003-1008	Quad Cities Station Units 1 and 2 Nuclear Plant Interface Requirements (NPIRs)	3
QCAN 901-8 H-5	DG Room 1/2 High Temperature Alarm	10

SURVEILLANCES (COMPLETED)

Number	Description or Title	Date or Revision
QCOS 6600-10	Verify Operability of the Auto-Transfer Logic for the 1/2 Diesel Vent Fan	
QCOS 6600-15	Functional Test for DG Vent Nitrogen Backup System	06/17/2016
WO 1474658	U1 Emergency DG Largest Load Reject	01/21/2013
WO 1673875	U1 Emergency DG Largest Load Reject	01/09/2015
WO 1849752	U1 Emergency DG Largest Load Reject	03/19/2017

TRAINING DOCUMENTS

Number	Description or Title	Date or Revision
LN-3700	RBCCW Training Manual	3
LN-6600	Emergency Diesel Generator Training Manual	24

WORK DOCUMENTS

Number	Description or Title	Date or Revision
00832688-01	Take Airflow Reading from the Intake of Unit 1/2 EDG Room	07/12/2006
00860083	DG Temperature Loop Calibration	01/07/2008
01178511	Grease DG Vent Fan Motor	01/01/2010
01263059	Disassemble/Clean/Inspect/Regrease Coupling on RBCCW pump	
01456221-01	Unit 1/2 EDG Damper Internal Inspection and Calibration	10/02/2012
01595343	Troubleshoot Relay 1-0595-149D Not Energized	12/18/2012
01761578	Replace the 1B RHR Pump Seal Cooler Per EC 398602	
01801757	Install Close Torque Switch Bypass Mod in 1-1001-29A	04/02/2017
01802371	EM EWP 4kV Horizontal Breaker Inspection (Merlin Gerin)	01/12/2017
01803155	EWP Perform 4kV Horizontal Breaker Inspection (Merlin Gerin)	12/22/2016
01817544	As-Found MSIV Closure Times QCOS 0250-04	03/27/2017
01817546	MSIV Fail Safe Test QCOS 0250-08	04/12/2017
01819369	Outboard MSIV Pressure Decay Test	04/12/2017
01819394	MSIV LLRT QCTS 0600-05	03/27/2017
01819549	Inboard MSIV Pressure Decay Test	04/09/2017
01819683	MSIV Solenoid Test QCOS 0250-09	04/12/2017
01827699	1/2 RBCCW Pump Motor Lube	11/11/2016
01842325	EM EWP Pre-Outage Receipt Inspection 4kV Horiz. Breaker #205	12/12/2016
01849721	U-1 1B Inboard MSIV 10% Scram Limit Switch Inspection	04/12/2017
01849723	U-1 2C Outboard MSIV 10% Scram Limit Switch Inspection	04/12/2017
01858174	REPLACE TT 0-5790-1 (THERMOSTAT) FOR EDG 1/2	01/26/2016
01947083	Sample and Change Oil for 1/2 RBCCW Pump	08/08/2017
04620531	Q1R24 PSU: EO ID Bus 14 FD Bkr Closing Springs Discharged	04/01/2017
04623157	Q1R24 Test the 1-203-1B Manifold	04/07/2017
04626477	As-Left MSIV Closure Times QCOS 0250-04	04/12/2017
04648570	Instrument Air Sample	09/25/2017
04653922	MSIV Scram Functional QCOS 0250-10&11	09/25/2017
04657452	1/2 Diesel Vent Fan Auto Transfer Logic	09/25/2017