UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

January 27, 2016

Mr. Bryan C. Hanson
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – COMPONENT DESIGN BASES INSPECTION (ENVIRONMENTAL QUALIFICATION PROGRAM) REPORT 05000317/2015011 AND 05000318/2015011

Dear Mr. Hanson:

On December 18, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on December 18, 2015, with Mr. G. Gellrich, Site Vice-President and other members of your staff. Following management review of the results of this pilot inspection, a telephonic exit meeting was conducted on December 22, 2015 with Mr. G. Gellrich, Site Vice-President and other members of your staff.

NRC inspectors examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. In conducting the inspection, the team examined Exelon's implementation of the electrical equipment environmental qualification program required by Title 10, *Code of Federal Regulations* (10 CFR) 50.49 for maintaining the qualified status of equipment during the life of the plant. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

No NRC-identified or self-revealing findings were identified during this inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system, Agencywide Documents 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/

Jeffrey A. Kulp, Chief
Engineering Branch 2
Division of Reactor Safety

Mr. Bryan C. Hanson
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

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Sincerely,

/RA/

Jeffrey A. Kulp, Chief
Engineering Branch 2
Division of Reactor Safety

DOCUMENT NAME: G:\DRS\Engineering Branch 2\Kern\CC CDBI Pilot EQ Pgm IR 2015011 FINAL.docx
ADAMS ACCESSION NUMBER: ML16029015

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DATE	1/26/16	1/27/16	1/27/16		

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Docket Nos. 50-317 and 50-318
License Nos. DPR-53 and DPR-69

Enclosure:
Inspection Report 05000317/2015011 and
05000318/2015011
w/Attachment: Supplemental Information

cc w/encl.: Distribution via ListServ

Letter to Bryan Hanson from Raymond McKinley

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – COMPONENT DESIGN BASES INSPECTION (ENVIRONMENTAL QUALIFICATION PROGRAM) REPORT 05000317/2015011 AND 05000318/2015011

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.:	50-317 and 50-318
License Nos.:	DPR-53 and DPR-69
Report Nos.:	05000317/2015011 and 05000318/2015011
Licensee:	Exelon Generation Company, LLC (Exelon)
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, MD
Inspection Period:	December 14 through December 22, 2015
Inspectors:	D. Kern, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader S. Pindale, Senior Reactor Inspector, DRS J. Brand, Reactor Inspector, DRS
Approved By:	Jeffrey A. Kulp, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY

IR 05000317/2015007 and 05000318/2015007; 12/14/2015 – 12/22/2015; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Component Design Bases Inspection (Programs).

The report covers the Component Design Bases Inspection (Programs) conducted by a team of three U.S. Nuclear Regulatory Commission (NRC) inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

No findings were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (Programs) (IP 71111.21N – 9 samples)

.1 Inspection Sample Selection Process

The inspection team assessed the implementation of Exelon's Environmental Qualification (EQ) program, established to meet the requirements of Title 10, *Code of Federal Regulations* (CFR) 50.49, "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants." The scope of this rule includes safety related equipment relied upon to remain functional during and following design basis events, non-safety related equipment whose failure under postulated environmental conditions could prevent safety-related equipment from performing design functions, and certain post-accident monitoring equipment. The team selected risk significant components for review using information contained in the Calvert Cliffs Probabilistic Risk Assessment (PRA) and the U.S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk (SPAR) model for the Calvert Cliffs Nuclear Power Plant (CCNPP). Additionally, the team referenced the Risk-Informed Inspection Notebook for the CCNPP in the selection of potential components for review. In general, the selection process focused on components which had a high Fussell Vesely Importance factor.

The NRC originally verified CCNPP EQ program implementation through a series of onsite inspections from 1984 – 1989. The EQ program at that time established measures to ensure EQ through the 40 year operating license period. Since that time, both units have renewed their operating licenses for an additional 20 years, and in 2014 Unit 1 entered its period of extended operation. The team initially compiled a list of components based on the risk factors previously mentioned. The team then interviewed plant staff, reviewed procurement, maintenance, and design records, and walked down plant areas susceptible to high energy line breaks. Based on these additional reviews, the team focused the inspection on EQ program elements and components which were repaired, modified, or replaced during the last 10 years (i.e., since 2004). Components from each unit were selected and included fan motors, pump motors, motor-operated valves (MOVs), air operated control valves, and pressure transmitters located both inside and outside of containment. For each component selected, the team also evaluated the environmental qualification of supporting sub-components including seals, lubricants, connectors, control and power cables, solenoids, transducers, limit switches, and terminal blocks.

.2 Results of Detailed Reviews

a. Inspection Scope

The inspection performed by the team was a pilot inspection conducted as outlined in NRC Inspection Procedure (IP) 71111.21N. The team assessed Exelon's implementation of the EQ program as required by 10 CFR 50.49. The team evaluated whether CCNPP staff properly maintained the EQ of electrical equipment important to safety through plant life (repair, replacement, modification, and plant life extension), established and maintained required EQ documentation records, and implemented an effective corrective action program to identify and correct EQ-related deficiencies and evaluate EQ-related industry operating experience.

This inspection effort included review of EQ program-related procedures, component EQ files, EQ test records, equipment maintenance and operating history, maintenance and operating procedures, vendor documents, design documents, and calculations. The team interviewed operators, engineers, maintenance staff, and procurement staff. Additionally the inspectors performed physical in-plant walkdowns (where accessible) to verify installed equipment was the same as described in Exelon's EQ component documentation files, verify components were installed in their tested configuration, determine whether equipment surrounding the EQ component may fail in a manner that could prevent the EQ component from performing its safety function, and verify that components located in areas susceptible to a high energy line break were properly evaluated for operation in a harsh environment. The team reviewed procurement records and inspected a sample of replacement parts stored in the warehouse to verify EQ parts approved for installation in the plant were properly identified and controlled; and that storage time and environmental conditions did not adversely affect the components' qualified life or service life. The inspectors also reviewed Exelon's evaluation of NRC Information Notice (IN) 2014-04, "Potential for Teflon® Material Degradation in Containment Penetrations, Mechanical Seals;" and NRC IN 2015-12, "Unaccounted for Error Terms Associated with the Irradiation Testing and Environmental Qualification of Important-to-Safety Components," to verify industry EQ-related operating experience issues were understood and addressed through the site corrective action program. Documents reviewed for this inspection are listed in the Attachment. Component samples selected for this inspection are listed below.

- 1MB114, Unit 1 Containment Cooling Fan 12 Motor (motor # 1X323727A4-MV)

- 2MA110, Unit 2 High Pressure Safety Injection Pump 23 Motor (serial # DF8377331). Purchase order 41739 describes the motor repair.

- 1MOV659-OP, Unit 1 Safety Injection Pump 11 Mini-flow Return Valve Motor Operator and associated limit switches (1-ZS-659A/B)

- 1MOV4145-OP, Unit 1 Containment Sump Discharge Valve Motor Operator and associated limit switches (1-ZS-4145A/B)

- 2MOV4516-OP, Unit 2 Steam Generator 21 Feed Water Isolation Valve Motor Operator and associated limit switches (2-ZS-4516A/B)

- 1CV5208, Unit 1 Component Cooling Heat Exchanger 12 Service Water Outlet Control Valve Solenoids (1SV5208 and 1SV5208A) and limit switches (1-ZS-5208A/B), and transducer (1-I/P-5208)

- 1CV4070A, Unit 1 Steam Generator 11 AFW Main Steam Bypass Control Valve Solenoid (1SV4070A) and limit switches (1-ZS-4070AA/B)

- 1PT102B, Unit 1 Pressurizer Pressure Transmitter (pressurizer low pressure trip function)

- 2PT1023A, Unit 2 Feed Water Steam Generator 22 Protection System Pressure Transmitter (reactor protection system trip, engineered safeguards features actuation system trip, and asymmetric protection function)

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of problems that Exelon had previously identified and entered into the corrective action program over the period 2010 to 2015. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, issue reports written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action documents that were sampled and reviewed by the team are listed in the Attachment.

B Findings

No findings were identified.

4OA6 Meetings, including Exit

On December 18, 2015, the team presented the inspection results to Mr. G. Gellrich, Site Vice President, and other members of the CCNPP staff. Following management review of the results of this pilot inspection, a telephonic exit meeting was conducted on December 22, 2015 with Mr. G. Gellrich, Site Vice-President and other members of your staff. The team reviewed proprietary information, which was returned to Exelon at the end of the inspection. The team verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Exelon Personnel
G. Gellrich, Site Vice President
W. Buffington, Procurement Engineer
K. Chermansky, Senior System Engineer
K. Eiane, Programs Engineer
M. Gahan, Manager, Engineering Modification Design
D. Hearst, Director, Maintenance
M. Herron, Manager, Electrical and Controls Design
E. Hussain, Senior Design Engineer
D. Johnson, Environmental Qualification Program Engineer
C. Junge, Design Engineer
J. Koelbel, PRA Engineer
J. Kilpatrick, Environmental Qualification Program Consultant
D. Lauver, Manager, Design Engineering
B. Mahoney, Design Engineer
C. McCall, CMO Mechanical Maintenance Specialist
S. Riechard, Regulatory Specialist
J. Smith, Director, Engineering
J. Suarez-Murias, Environmental Qualification Program Engineer
S. Waiters, Modification Design Engineer
F. Wilson, Programs Engineer
R. Wise, Environmental Qualification Program Consultant

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Open and Closed
None

LIST OF DOCUMENTS REVIEWED

Calculations and Engineering Evaluations
CA01749, Thermal Aging Assessment for NAMCO EA740 Limit Switches, Receptacle Assembly and Connector/Cable Assembly, Revision 3
CA02173, Thermal Aging Assessment for Limitorque Motors, Limit Switches and Torque Switches, Revision 2
CA03761, Uncertainty Calculation for Containment Pressure, Revision 0
CA03939, Thermal Life of Low Voltage Power, Control and Instrumentation Cable Insulation with GE-9025 Silicone Rubber Environmentally Qualified EQ Files CBL011 (Continental/CBL011/Hatfield, and CBL013/Cerro/Rockbestos), Revision 1
CA04416, East SG Compartment Pressurization, Revision 0

CA 05595, Thermal Life of Brand-Rex XLPE Insulated Instrument Cable Environmentally Qualified in EQ File CBL041, Revision 0
CA05649 Thermal Life of Continental CC-2123 Silicone Rubber Insulated Low Voltage Power Wire Environmental Qualified in EQ File CBL024, Revision 0
CA05651, Thermal Life of Brand-Rex FR-XLPE Instrument Low Voltage Power, Control and SIS Wire CBL039, Revision 0
CA06087, Qualified Life Determination for Rosemount Pressure Transmitter Circuit Boards, Revision 2
CA06749, Thermal Aging Assessment of Raychem Flamtrol SIS Wire, Revision 0
CA06749, Thermal Aging Assessment for Various ASCO Solenoid Valves, Revision 0
CA06774, Containment Response to Loss of Coolant Accident and Main Steam Line Break, Revision 2
CA07199, Thermal Aging Assessment for General Electric 4 kV – HPSI and LPSI Pump Motor Model Nos. 5K 811 052 C 34 (HPSI) and 5K 811 052 A 108 (LPSI), Revision 0
CA07215, Thermal Aging Assessment for Models NP (L) 8320/(L) 206-381/NPEF (L) 8300, Revision 0
CA07725, Analysis of Containment Integrity in DBA LOCA, Revision 0
CE Doc B-PENG-99-016-25, TS Action Value Basis Document: Module 8 – Containment Atmosphere Pressure, Revision 1
E89023, Thermal Aging Assessment of Terminal Blocks used in Limitorque Actuators, Revision 1
E93014, Thermal Aging Assessment of the Reliance Electric Company Model B79C6976M Electric Motors, Revision 3

Corrective Action Program Condition Reports and Issue Reports

2009-005718	02600514*
2012-006913	02600584*
2013-002197	02601581*
2013-006352	02601600*
02514624	02601916*
25999131*	02601965*
02600501*	02601967*

* Issue reports written as a result of this inspection

Design and Licensing Basis Documents
NRC Safety Evaluation Reports for Environmental Qualification of Safety-Related Electrical Equipment, dated 5/28/81, 12/16/82, and 11/20/84
Calvert Cliffs Unit 1 and Unit 2 Technical Specifications, Amendment 314/292
Calvert Cliffs Unit 1 and Unit 2 Updated Final Safety Analysis Report, Revision 48

Drawings
12320-0001, 3” – 12” Forged, Bolted Bonnet Nuclear Gate Valve, Revision 25
60603, Instrument Location Containment & Auxiliary Building Unit 1, 45’ Elevation, Revision 27
60604, Instrument Location Containment & Auxiliary Building Unit 1, 69’ Elevation, Revision 37
60708SH0002, Circulating Salt Water Cooling System, Revision 114
60723SH0001, Ventilation Systems: Containment, Turbine and Penetration Rooms, Revision 63

60731SH0001, Safety Injection and Containment Spray Systems, Revision 90
60731SH0003, U-1, Safety Injection and Containment Spray Systems, Revision 31
62603, Instrument Location Containment & Auxiliary Building Unit 2, 45' Elevation, Revision 43
62604, Instrument Location Containment & Auxiliary Building Unit 2, 69' Elevation, Revision 27
62702SH0004, Condensate and Feedwater, Revision 48
62731SH0001, Safety Injection and Containment Spray Systems, Revision 83
63079SH0027D, Schematic Diagram Condensate and Feedwater Motor Operated Valve 1MOV4516, Revision 1
63196SH0028C, Connection Diagram Motor Operated Valves Limit Seated, Revision 1

Engineering Changes
ECP-09-000184, 10 CFR 50.49 Environmental Qualification Program, Revision 1
ECP-09-000184-ES-024-0400, 10 CFR 50.49 Environmental Qualification Program, Revision 1
ECP-11-000334-CN-005, ZS0021-1900, Namco Valve Position Switch EA180 Series Including EC210 Series and EC290 Series Receptacle Assembly and Connector Cable Assembly, Revision 19
ECP-11-000642-CN-001, ZS0021-1900, Namco Valve Position Switch EA180 Series Including EC210 Series and EC290 Series Receptacle Assembly and Connector Cable Assembly, Revision 19
ECP-11-000642-CN-003, TB0008-001-0500, Terminal Block Buchanan NQB 100 Series, Revision 5
ECP-12-000223-CN-003 ZS0021-1900, Namco Valve Position Switch EA180 Series Including EC210 Series and EC290 Series Receptacle Assembly and Connector Cable Assembly, Revision 19
ECP-12-000638-CN-004, TB0008-001-0500, Terminal Block Buchanan NQB 100 Series, Revision 5
ECP-13-000127-CN-002 ZS0021-1900, Namco Valve Position Switch EA180 Series Including EC210 Series and EC290 Series Receptacle Assembly and Connector Cable Assembly, Revision 19

Functional, Surveillance and Qualification Testing
17467-MTR002, Final Report on the Evaluation of the Qualification of Containment Cooling Fan Electric Motor (Qualno MTR002) Reliance Electric Company, Revision A
CNG-FES-032, Standard for Evaluating Motor Operated Valve Magnesium Rotor Degradation, Revision 100, completed 8/12/10
EPRI NP-4172SP, Radiation Data for Design/Qualification of Nuclear Plant Equipment, 8/85
F-C3050, Qualification Tests of Cables under Simulated Reactor Containment Service Conditions, 5/71
Rosemount Report D8700096, Qualification Report for Rosemount Model 1154 Series H Pressure Transmitter, Revision J
X-604, Qualification Testing of Joy Axivane Fan and Reliance Electric Motor, 4/6/77

Miscellaneous
AQS-21678/TR, Qualification of ASCO Catalog NP-1 Valves with Viton-A Elastomers, Revision A
EQER SV0038, and ZS0021, Table H-1, Qualified Lives (Years), Revision 20 and 32
EQ File CBL008, Cerro (Rockbestos) Cable Pyrotrol III, Revision 13

EQ File CBL013, CERRO (Rockbestos) Power, Control and Instrumentation Cable Type KS-550, Revision 14
EQ File CBL018, Kerite Medium Voltage Power Cable HTK (N98)/HTNS (HI-70), Revision 9
EQ File CBL024, Continental Wire and Cable Company Silicone Rubber (CC-2193) Insulated Cable Low-Voltage Power, Control Cable and Thermocouple Wires (All Areas) and Instrumentation Cable (Rooms 206, 227, and Radiation-Only Areas), Revision 10
EQ File CBL039, Brand-Rex, FR-XLPE Low Voltage Power and Control Cable and SIS Wire, Revision 4
EQ File CBL041, Brand-Rex, Instrumentation Cable for use Inside Containment and all Areas Outside Containment, Revision 10
EQ File CBL045, Rockbestos Firewall III Irradiated Cross-Linked Polyethylene Insulated SIS Wire, Power and Control Cables, Revision 13
EQ File CBL046, Rockbestos Firewall III Chemically Cross-Linked Polyethylene Insulated SIS Wire, Power and Control Cables, Revision 15
EQ File IP0005, ITT Model GT25CD1826, Revision 0
EQ File LUBE01, Texaco Premium RB Grease, Regal R&O 32 and R&O 46 Oil, Revision 7
EQ File LUBE02, Chevron Grease SRI-2 and Exxon Polyrex EM Grease, Revision 4
EQ File MOV001, Limitorque Motor Operator SMB Series, Revision 21
EQ File MOV002, Limitorque Motor Operated Valves SMB Series, Revision 19
EQ File MTR002, Reliance Electric Company Model 1X323727, 1XF883713, 1XF882748, SYZ01381-A1-PW and S7533812, Containment Cooling Fan Motor, Revision 12
EQ File MTR003, General Electric HPSI and LPSI Pump Motors Model Nos. 5K811052C34 (HPSI), 5K811052C35 (HPSI), and 5K811052A108 (LPSI), Revision 9
EQ File PT0009, Rosemount Pressure Transmitters Model 1154, Series H, Revision 14
EQ File SEAL01, Raychem Heat Shrinkable Tubing, Revision 14
EQ File SEAL02, Raychem Molded Low Voltage NMCK and NPKV Kits, Revision 15
EQ File SEAL08, NAMCO 1/2” Connector Seal Assemblies Including EC210-44000/EC201-44200 Connector/Cable Series and EC290-44000 Connector/Cable Series, Revision 9
EQ File SEAL11, Raychem 5kV Motor Connection Kits Type NMCK8, NMCK8-4V and NMCK8-5V, Revision 7
EQ File SEAL14, NAMCO RTV Thread Sealant Model EH450-00014 (Dow Corning 734 RTV), Revision 4
EQ File SV0034, ASCO Solenoid Valve Models NP(L)8316 and NP(L)8344, Revision 17
EQ File SV0038, ASCO Solenoid Valves Models NP(L)8320/ (L)206-381/ NPEF(L)8300, Revision 32
EQ File TB0008, Buchanan NQB Series Terminal Block Used in all Plant Areas for Control Applications up to 120 VAC or 125 VDC, Revision 7
EQ File ZS0021, Namco Valve Position Switch EA180 Series Including EC210 Series and EC290 Series Receptacle Assembly and Connector Cable Assembly, Revision 19 and 20
ES-014, Summary of Ambient Environmental Service Conditions, Revision 4
ES-024, 10 CFR 50.49, Environmental Qualification Program, Revision 4
IEEE Std 323-1974, IEEE Standard for Qualifying Class 1E Equipment of Nuclear Power Generating Station, Revision 0
IEEE Std 382-1985, IEEE Standard for Qualification of Actuators for Power Operated Valve Assemblies with Safety-Related Functions for Nuclear Power Plants, dated 10/14/85

IEEE Std 382-2006, IEEE Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations, dated 3/15/07
Maintenance Strategy 1 I/P5208, Masoneilan Model 8005N, dated 1/16/12
Maintenance Strategy 1MOV659OP, Unit 1 Safety Injection Pump 11 Mini-flow Return Valve Motor Operator, dated 11/19/15
Maintenance Strategy 1MOV4145OP for Limitorque Model SMB-2, Containment Sump Discharge Valve, dated 12/6/12
Maintenance Strategy 1MOV4116OP for Limitorque Model SMB-2, 21 Steam Generator FW Isolation, dated 8/15/12
Maintenance Strategy 1PT102B, 11 RCS Pressurizer Pressure Transmiitter, dated 6/26/15
Maintenance Strategy 1SV4070A, 11 Steam Generator AFW Main Steam Bypass Valve, dated 12/1/15
Maintenance Strategy 1SV5208, Component Cooling Heat Exchanger 12 Salt Water Outlet, dated 11/4/05
Maintenance Strategy 1SV5208A, Component Cooling Heat Exchanger 12 Salt Water Outlet, dated 3/3/06
Maintenance Strategy 1ZS4070AA, 11 Steam Generator AFW Main Steam Supply Bypass Valve Limit Switch, dated 1/5/11
Maintenance Strategy 1ZS5208A, Component Cooling Heat Exchanger 12 Salt Water Outlet, dated 9/12/11
Maintenance Strategy 1ZS5208B, Component Cooling Heat Exchanger 12 Salt Water Outlet, dated 9/12/11
Maintenance Strategy 2MA110, Unit 2 High Pressure Safety Injection Pump 23 Motor, dated 11/19/15
Maintenance Strategy 2PT1023A, 22 Feedwater Steam Generator Protection System Pressure Transmitter, dated 6/19/12
NRC IN 2011-12, Reactor Trips Resulting From Water Intrusion into Electrical Equipment, Revision 0
NRC IN 2014-11, recent Issues Related to the Qualification and Commercial Grade Dedication of Safety-Related Components, Revision 0
NRC IN 2015-12, Unaccounted for Error Terms Associated with the Irradiation Testing and Environmental Qualification of Important-to-Safety Components, Revision 0
NRC Regulatory Guide (RG) 1.73, Qualification Tests for Safety-Related Actuators in Nuclear Power Plants, Revision 1
NRC RG 1.89, Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants, Revision 1
NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, Revision 1
Product memorandum 01-GB-1, Grayboot and Grayboot A, Separation of GB-1 Connectors during Recent LOCA Testing, Revision A, dated 2/15/02
Qualification Maintenance Requirement Sheet (QMRS), IP0005-103, ITT-Enidine-Conoflow Model GT25CD1826, 1-I/P-5206 and 5208, Salt Water Component Cooling Heat Exchanger Outlet I/P, Revision 0
QMRS 1MB102/114/402/414, Containment Cooling Fan Motors, Revision 14
QMRS 1MOV659/660, Containment Spray/Safety Injection Recirculation Control, Revision 3
QMRS 1ZS5208A/B, Component Cooling Heat Exchanger 12 Salt Water Outlet, Revision 5
QMRS 2MA110, No. 23 HPSI Pump Motor, Revision 5
QMRS CBL009 (1MOV659), Revision 0

QMRS CBL013 (1MOV659), Revision 0
QMRS CBL018, Kerite Cable, Revision 0
QMRS MOV001-201, 2MOV4516, Feedwater to Steam Generator No. 21 Isolation, Revision 8
QMRS MOV002, 1MOV659 and 1MOV 660, Revision 3
QMRS MOV002-109, 1MOV4144 and 1MOV4145, Containment Sump Discharge Valves Revision 5
QMRS PT0009-001, 2PT1023A,B,C,D, Revision 3
QMRS PT0009-101, 1PT102B, Revision 2
QMRS SEAL01-001, Raychem Heat Shrinkable Tubing (Rating 1,000 Volts), Revision 8
QMRS SEAL02, Heat Shrinkable Tubing, Revision 6
QMRS SEAL08-001, Model No EC210-34001/44000 Series or 44200 Series 4 Pin Cable/Connector Assembly, Revision 6
QMRS SEAL08-002, Model No EC290-34001/44000 Series 4 Pin Cable/Connector Assembly, Revision 0
QMRS SEAL11, 4kV – 8kV Motor Connection Kits, Revision 7
QMRS SEAL12-001, WEED Instrument/EGS/ Patel Engineering Quick Disconnect (QDC) Electrical Connectors, Revision 3
QMRS SEAL12-001, WEED Instrument/EGS/ Patel Engineering Quick Disconnect (QDC) Electrical Connectors, Revision 12
QMRS Seal14, NAMCO RTV Thread Sealant Model EH450-00014 (Dow Corning 734 RTV), Revision 2
QMRS SEAL15-001, Electrical Quick Disconnect Grayboot Connectors GB-1, GB-2, GB-3, Revision 8
QMRS SEAL38-111, 1SV-5206, 1SV-5206A, 1SV-5208, and 1SV-5208A, Component Cooling Heat Exchangers 11 and 12, Revision 4
QMRS SV0034, 1-SV-4070A No 11 AFW Pump Steam Supply Bypass, Revision 1
QMRS TB0008, Buchanan Terminal Block Used in all Plant areas for Control Applications up to 120 VAC (Nominal) 125 VDC (Nominal), Revision 7
QMRS TB0008-001, Buchanan Terminal Block NQB 100 Series, Revision 5
QMRS ZS0021-101, 1ZS5208A/B NAMCO 2-ZS-3833A/B Limit Switch, Revision 8
QMRS ZS0021-102, 1ZS4070AA/AB NAMCP Model EA180-24501 Limit Switch with Receptacle, Revision 11
P-CAL-030439, PM Change Request (No. 23 Containment Air Cooler Motor), dated 8/5/13
Regulatory Guide 1.89, Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants, Revision 1

Procedures
CC-AA-203, Environmental Qualification Program, Revision 11
EN-1-103, Control of 10CFR50.49 Environmental Qualification of Electrical Equipment, Revision 00300
ES-014, Summary of Ambient Environmental Service Conditions, Revision 4
ES-024, 10CFR50.49 Environmental Qualification Program, Revision 4
MOV-12, Limitorque Motor Operated Valve Inspection and Preventive Maintenance, Revision 01201
PES-S-002, Shelf Life, Revision 8
PI-AA-120, Issue Identification and Screening Process, Revision 3
SM-AA-102, Warehouse Operations, Revision 21

Purchase Orders
433816
434090
443157

Vendor Evaluations, Documents and Technical Manuals
12103-006-1004, Custom 8000 Horizontal Induction Motors, dated 11/84
AQR-67368, Test Report on Qualification of Automatic Switch Corporation (ASCO) Solenoid Valves for Safety Related Applications in Nuclear Power Generating Stations, Revision 1
AQS-21678/TR, Test Report on ASCO Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation Wearing, Seismic Simulation, Vibration Endurance, Accident Radiation, and Loss of Coolant Accident (LOCA) Simulation, Revision A
FCD LMAIM1401-00, Limitorque SMB Series/SB Series Installation and Maintenance, Revision 0
MOV001, Limitorque Corporation, Motor Operator, SMB Series
MOV002, Limitorque Corporation, Motor Operated Valves, SMB Series
PT0004, Rosemount Pressure Transmitter Model-1153 Series D
PT0008, Rosemount Pressure Transmitter Model-1154 Series D
PT0009, Rosemount Pressure Transmitter Model-1154 Series H
SEAL01, Raychem Heat Shrinkable Tubing WCSF-N, dated 12/16/13
SEAL02, Raychem Molded Low Voltage Kits
SEAL04, Conax Electrical Conductor Seal Assembly
SEAL06, Patel/EGS Conduit Seals P/N 841206
SEAL08, Namco Cable Connector Seal Assemblies EC 21034000 Series Receptacle & EC 21044000/EC 21044200 Series Connector Cable Assemblies
SEAL14, NAMCO RTV Thread Sealant Model EH450-00014, Revision 2
SEAL15, EGS Grayboot Connector GB-1, GB-2, GB-3,
SV0034, ASCO Solenoid Valve Models NP 9L) 8316 and (L) 8344
TB0001, Marathon Terminal Blocks Model 6000 and 1600
TB0003, Buchanan Terminal Blocks B Series
TB0001, Marathon Terminal Blocks NQB Model
VTD-R165, Reliance Electric Company Instruction Manual, dated 2/85
VTD-L200-1021, Limitorque Technical Update 93-03, Reliance 3-Phase Limitorque Actuator Motors, dated 9/93
VTM-12904-016, Rosemount Model 1154, Series H Transmitter, Revision 12
VTM-L200-0001, Motor Operated Valves and Accessories, Revision 0
VTM-L200-1001, Limitorque Type SMB Instructions and Maintenance Manual, Revision 1
ZS0020, NAMCO BZE6-2RN Position Switches

Work Orders

1200404332	2200703707	C90945507
120064765	220090962	C90949350
120082673	C90683626	C91950986
120084881	C91507677	C92115090
200299681	C91704052	C92949011
219904126	C92351935	
220034736	C92808620	

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CCNPP	Calvert Cliffs Nuclear Power Plant
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
EQ	Environmental Qualification
EQER	Environmental Qualification Evaluation and Review
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
MOV	Motor Operator Valve
NRC	Nuclear Regulatory Commission
PRA	Probabilistic Risk Assessment
QMRS	Qualification Maintenance Requirement Sheet
RG	Regulatory Guide
SPAR	Standardized Plant Analysis Report
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VAC	Volts, Alternating Current
WO	Work Order