UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

September 7, 2018

Mr. Daniel G. Stoddard
Senior Vice President and
Chief Nuclear Officer
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION - NRC DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT NUMBER 05000280/2018011 AND 05000281/2018011

Dear Mr. Stoddard:

On July 26, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station Units 1 and 2 and the NRC inspectors discussed the results of this inspection with Mr. Fred Mladen and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

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/

Marvin D. Sykes, Chief
Engineering Branch 1
Division of Reactor Safety

Docket Nos. 50-280, 50-281
License Nos. DPR-32, DPR-37

Enclosure:
Inspection Report 05000280/2018011
and 05000281/2018011

cc: Distribution via ListServ

SUBJECT: SURRY POWER STATION - NRC DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT NUMBER 05000280/2018011 AND 05000281/2018011

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DATE	9/5/2018	9/4/2018	8/10/2018	9/5/2018	9/7/2018		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: S:\DRS NEW\ENG BRANCH 1\BRANCH INSPECTION FILES\2017-2018-2019 CYCLE INSPECTION FOLDER FOR ALL SITES\ENG PROGRAMS\SURRY EQ 2018\SUR EQ INSPECTION REPORT REV 1.DOCX

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000280, 05000281
License Numbers:	DPR-32, DPR-37
Report Numbers:	05000280/2018011, 05000281/2018011
Enterprise Identifier:	I-2018-011-0018
Licensee:	Virginia Electric and Power Company
Facility:	Surry Power Station
Location:	Surry, VA
Inspection Dates:	July 9, 2018, to July 26, 2018
Inspectors:	M. Greenleaf, Reactor Inspector E. Stamm, Senior Reactor Inspector C. Franklin, Reactor Inspector N. Morgan, Reactor Inspector
Approved By:	Marvin D. Sykes, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Virginia Electric and Power Company's performance at Surry Power Station Units 1 and 2 by conducting a design bases assurance inspection (programs) in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information

No findings or more-than-minor violations were identified.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedure (IP) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, performed walk downs, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.21N - Design Bases Assurance Inspection (Programs)

The inspectors evaluated environmental qualification program implementation by reviewing the following components from July 9 - 13, 2018, and July 23 - 26, 2018:

Environmental Qualification (EQ) Program Components (4 Samples)

(1) 01-SI-MOV-1863A-MOTOR/VALVOP, Unit 1 Low Head Safety Injection Pump A Supply to Alternate High Head Safety Injection Motor Operated Valve (Limitorque: actuator including motor, terminal boards, and limit and torque switches)

(2) 01-SI-P-1B, Unit 1 Safety Injection Pump Motor B Westinghouse: motor including insulation and cable splice)

(3) 02-CM-MUX-30A, In Core Thermocouple Multiplexer (Validyne: multiplexer fan, multiplexer EMI filter, remote multiplexer module, multiplexer power supply)

(4) 02-PEN-EP-6A-PENETR, Electrical Penetration (Amphenol: Header plate, interconnecting cable assemblies, connectors)

EQ Program Components Inside Primary Containment (3 Samples)

(1) 01-RC-TE-1432A-DETECT, Unit 1 Hot Leg Loop C Resistance Temperature Detector (RTD) (Weed Instrument Company: including wiring, coating, and conduit seal)

(2) 01-VMS-YY-100A-1-INTCPM, Pressurizer PORV Position Indicator Transient Shield. (Technology for Energy Corporation (TEC): sensors (accelerometers), sensor preamplifiers (charge converters), wiring)

(3) 02-FW-MOV-2D-MOTOR/VALVOP, Unit 2 Steam Generator B Auxiliary Feedwater Flow/Isolation Valve (Limitorque: actuator including motor, terminal boards, and limit and torque switches)

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

- On July 26, 2018, the inspectors presented the inspection results to Mr. Fred Mladen, and other members of the licensee staff.

DOCUMENTS REVIEWED

Corrective Action Documents Written as a Result of the Inspection
CR 1100058, 2018 NRC EQ DBAI – Test Report Discrepancy for 1-SW-P-5D Replacement
CR 1101305, 2018 NRC EQ DBAI – 02-PEN-EP-9C
CR 1101322, 2018 NRC EQ DBAI – Amphenol Documentation Discrepancy
CR 1101374, 2-CM-MUX-30A Has Missing Mounting Hardware
CR 1101391, 2018 NRC EQ DBAI – Containment Spray pH Modeling
CR 1101606, 2018 NRC EQ DBAI – VMS RTV Sealant Requirement (EQ)
CR 1101821, 2018 NRC EQ DBAI – EQ Evaluation Needed for AFW MOV Throttling
CR 1102029, 2018 NRC EQ DBAI – Limitorque Accident Margin Discrepancy
CR 1102030, 2018 NRC EQ DBAI – Limitorque PQE Discrepancy
CR 1102038, 2018 NRC EQ DBAI – JCO Inaccurate Value
CR 1102106, 2018 NRC EQ DBAI – UFSAR Containment Parameters Discrepancy
CR 1102107, 2018 NRC EQ DBAI – EQ-0051 Discrepancy
CR 1102108, 2018 NRC EQ DBAI – Additional EQ Analysis for MOV Voltage Margins
CR 1102225, 2018 NRC EQ DBAI – Auditable Record Accessibility

Procedures
0-ECM-1413-02, Low Head Safety Injection Pump Motor Maintenance, Rev. 16
0-ECM-1501-01, Limitorque Motor Operated Valve MOV) Motor and Operator Maintenance, Rev. 34
0-EPM-1503-01, Motor Operated Valve (MOV) Operator Inspection, Rev. 9
0-ICM-CM-MPX-001, Validyne Multiplexing System Troubleshooting, Rev. 6
0-ICM-RC-TE-9004, Reactor Coolant System Narrow Range RTD Checkout and Installation, Rev. 9
0-MCM-0304-02, Limitorque Size SMB-00 Overhaul, Rev. 17
0-MPM-0300-01, Limitorque Rising Stem Operator Type SB, SBD, and SMB Lubrication and Inspection, Rev. 25
1-PT-2.28, Valve Monitoring System, Rev. 14

2-IPM-CM-MUX-030, Validyne Remote Multiplexer (MUX-030), Rev. 10
2-OPT-CT-207, Electrical Penetration Type B Local Leak Rate Test
CM-AA-EQ-10, Fleet EQ Program Description, Rev. 2
CM-AA-EQ-10, Fleet EQ Program Description, Rev. 2
CM-AA-EQ-1000, EQ Walkdowns, Rev. 4
CM-SU-EQ-100, Environmental Qualification Program Implementation, Rev. 4
CM-SU-EQ-101, Breaching Environmental Zones, Rev. 1
DOM-QA-1, Nuclear Facility Quality Assurance Program Description, Rev. 27
ER-AA-102, Preventive Maintenance Program, Rev. 11
ER-AA-PRS-1010, Preventive Maintenance Task Basis & Maintenance Strategy, Rev. 10
GMP-015, Raychem Insulation Removal and Installation, Rev. 32
IMP-C-MI-113, Acoustical Monitoring Accelerometers, Rev.9
MS-AA-SLD-701, Shelf Life Evaluation and Control, Rev. 3
MS-AA-WHS-132, Control of Shelf Life Material, Rev. 2
PI-AA-100-1007, Operating Experience Program, Rev. 17
SU-EQUAL-000-38-EQMM, Equipment Qualification Maintenance Manual, Rev.48
VPAP-0812, Station Lubrication Program, Rev. 17

Drawings
11548-ESK-6AC, Elementary Diagram 480V Containment Spray Pumps Surry Power Station – Unit 2
11548-FM-068A, Flow/Valve Operating Numbers Diagram Feedwater System Surry Power Station Unit 2 Virginia Power, Rev. 62
11548-FP-1A, Main Steam – Reactor Containment, Rev. 8
11548-QE-36X, Wiring Diagram Electrical Penetration 6A Surry Power Station – Unit 2

Calculations
01039.6210-USB-107, Containment LOCA Analysis for Core Uprate, Rev. 0
12846.44-USB-052, Containment Post-Accident Environmental Conditions for Equipment Qualification, Rev. 52
EE-0034, Surry Voltage Profiles, Rev. 3
NE-0138, EQ Motor Temperature due to Motor Space Heaters, Rev. 0
SM-1475, Surry LOCA Containment Peak Pressure and Depressurization Analysis with GOTHIC, Rev. 0
SU-CALC-NFL-SM-0601, Surry Quench Spray and Post-LOCA Sump pH Calculations, Rev. 1
SU-CALC-RAD-12846.44-USB-052, Containment Post-Accident Environmental Conditions for Equipment Qualification, Rev. 3

Corrective Action Documents

383881	1056998	1077040
462262	1057742	1078500
534243	1061142	1095507
1004390	1065847	1097037
1011377	1069333	1101374

Work Orders

96683	38103334792	38102273667
38102112719	38103462170	38103334847
38102113557	38103644271	38103434958
38102298367	38103644329	38103751753
38102543773	38102181846	38203877050

Self-Assessment Reports

PIR1076739, EQ Self-Assessment

Miscellaneous Documents

06-8680-003, Nuclear Component Qualification Test Report for the Generic Qualification of Weed Instrument Company Temperature Sensor Assemblies, Rev. 0

06-8680-TP, Nuclear Component Qualification Test Plan for the Generic Qualification of Weed Instrument Company Temperature Sensor Assemblies, Rev. 1

210-81 A, Technical Abstract on Epon Resin, Dated 11/12/1986

2-RC-TE-2412A and 2-RC-TE-2412D, Plant at or near HSD, loop room ventilation in service, and at isothermal conditions

3035-313224-008, IEEE Project Specific Similarity Analysis Addendum to Qualification Report No. 06-8680-003, Rev. 3

3035-313224-008, IEEE Project Specific Similarity Analysis Addendum to Qualification Report No. 06-8680-003 Rev. 1, Rev. 3

38-A331-00001, Amphenol Cables, Special Connectors, Engineered Interconnections: Technical Manual for Penetrations, Rev. 2

38-L553-00001, Limitorque Type SMB Instruction and Maintenance Manual, dated November 17, 2011

38-T265-00001, TEC Model 1414-7-(4) Acoustic Valve-Flow Monitoring System Operation and Maintenance Manual, Rev. 5

38-V608-00001, High Speed Data Acquisition System and Remote Multiplexer Units, Rev. 7

38-V608-00008, Validyne Wiring Diagram for Fan and Filter, Rev. 1

38-W813-00001, Installation/Instruction/Operation Manual for Weed Instrument Co., Inc., Rev. 3

517-TR-03, Final Qualification Test Report for Environmental and Seismic Testing of the TEC Valve Flow Monitoring Systems, Rev. 2

8501170133, Virginia Electric and Power Company Surry Power Station Resolution of SER's for Environmental Qualification of Safety-Related Electrical Equipment, dated January 11, 1985

B0003, Qualification Type Test Report, Limitorque Valve Actuators for Class 1E Service Outside Primary Containment, dated May 28, 1976

B0058, Limitorque Valve Actuator Qualification for Nuclear Power Station service, dated January 11, 1980

C19QA061, Environmental Test Report Hermetic Feed Through Connector Type 1A, 19/C-NO.16 AWG and Mating Plugs Used on Electrical Penetrations at the Surry Power Station, Dated 2/28/1972

Clarification of Information Related to the Environmental Qualification of Limitorque Motorized Valve Operators, Aug 31, 1989

Component Summary Sheet for 1-RC-TE-1432A-DETECT

Component Summary Sheet for 1-SI-MOV-1863A-MOTOR

CT-EQUAL-000-GQE-03.01-G01, Limitorque Motor Operator, Rev. 0

CT-EQUAL-000-GQE-03.02-G01, Rev. 0

CT-EQUAL-000-GQE-04.03-G02, Rev. 0

CT-EQUAL-000-PQE-03.01-P01, Limitorque Motor Operated Valve, Rev. 0

CT-EQUAL-000-PQE-03.02-P01, Rev. 0
EDD-080, Evaluation of Black Fiberite Type 5064 as a Substitute for Brown (Natural) Fiberite Type 5064 In Nuclear Safety Related Applications, Mar 2, 2001
EE0025, Performance Requirement Assessment for Electric Motors, Rev. 0
Environmental Qualification of Safety-Related Electrical Equipment IEB 79-01B Technical Evaluation Report Surry 1, Nov 25, 1980
Environmental Qualification of Safety-Related Electrical Equipment IEB 79-01B Technical Evaluation Report Surry 2, Nov 26, 1980
Environmental Qualification of Safety-Related Electrical Equipment Surry Power Station, Unit Nos. 1 and 2 Order for Modification of License Concerning Environmental Qualification of Safety-Related Electrical Equipment, October 24, 1980, Mar 26, 1981
Environmental Zone Description Surry Power Station – Units 1 and 2, Aug 24, 1981
EQ-0044, Evaluation of Limitorque Motor Leads for Compatibility with Raychem Nuclear Products, Rev. 0
EQ-0051, Evaluation of Temperature Monitoring Data from Surry Power Station, dated December 17, 1993
EQ-0051, Evaluation of Temperature Monitoring Data from Surry Power Station, Rev. 0
ET-CEP-06-0016, Review of EQ Accident Profiles in Support of GSI-191 Sump Strainers, Rev. 0
ET-CEP-06-0016, Review of EQ Accident Profiles in Support of GSI-191 Sump Strainers, Rev. 0
ETE-NA-2016-0063, EQ Evaluation of Beta Dose for Limitorque MOVs and SIS Wire in Containment, Rev. 0
EWR-88-072, Modification of Low Head Safety Injection Pump (I-SI-P-IB), 2/9/89
Final Resolution of Environmental Qualification of Electric Equipment Important to Safety, Safety Evaluation Report, Mar 12, 1985
GQE-06.16-G02, Generic Qualification Evaluation for Validyne Engineering Corporations Multiplexer, Rev. 0
GQE-08.17-G01, Generic Qualification Evaluation for Weed Thermocouple/RTD, Rev. 0
GQE-08.25-G01, Generic Qualification Evaluation for TEC Acoustic Monitor/Accelerometer, Rev. 0
GQE-15.05-G01, Generic Qualification Evaluation for DG O'Brien Inc. Electrical Penetration, Rev. 0
IE Bulletin 79-01 (November 1, 1980 Submittal) Surry Power Station Unit Nos. 1 and 2 North Anna Power Station Unit No. 1, Oct 31, 1980
IE Bulletin 79-01B (December 1, 1980 Revision) Surry Power Station Unit Nos. 1 and 2 North Anna Power Station Unit No. 1, Dec 1, 1980
Inspection Report No. 50-280,281/86-12, Nov 3, 1986
Inspection Report No. 50-280,281/88-24, Jul 26, 1988
Letter from Limitorque Corporation to EO Tech, Yankee Atomic Electric Company Qualification Information Letter ET 84.1.25.1, Feb 6, 1984
Letter from Limitorque Corporation to GPU Nuclear, NRC Information Notice 83-72, Jun 29, 1984
Letter from Limitorque Corporation to VEPCO, Test Units, Jun 15, 1981
Letter from NTS to Ricky Gotcher, RE: Applied Research Laboratories Analyses of Weed Instruments Company RTDs, dated September 23, 1982
Memo from M. T. Davidson, Trip Report Limitorque Corporation Peerless Actuator Motors, dated August 31, 1987
NTS Letter for Weed RTD Epoxy, dated 9/23/1982

Nuclear Power Station Qualification Type Test Report Limitorque Valve Actuators with Type LR for Westinghouse PWR Report B0212, Apr 4, 1985
PO 20190, Southwest Research Lab. To Perform Qualification Testing on 12 Temperature Sensors, Rev. 2
PQE-06.16-P02, Plant Qualification Evaluation for Validyne Engineering Corporations Multiplexer, Cables, and Connectors, Rev. 1
PQE-08.17-P01, Plant Qualification Evaluation for Weed Resistance Temp. Detector, Rev. 0
PQE-08.25-P01, Plant Qualification Evaluation for TEC Acoustic Monitor/Accelerometer, Rev. 0
PQE-15.05-P01, Plant Qualification Evaluation for Amphenol Electrical Penetration, Rev.0
QTR-82-002, Nuclear Environmental Qualification of the Remote Multiplexer Unit Models MC170AD-Q2 and MC370AD-Q2 and Associated PC Boards and Plug-In Modules, Rev. E
Request for Additional Information Equipment Environmental Qualification (EEQ) Review of Licensees' Resolution of Outstanding Issues from NRC Equipment Environmental Qualification Safety Evaluation Reports (SER) and TMI Action Plan Installed Equipment, Nov 30, 1981
Response to IE Bulletin 79-01B (45-day report) Surry Power Station Unit Nos. 1 and 2 North Anna Power Station Unit No. 1, Jun 16, 1980
Response to IE Bulletin 79-01B (90-day report) Surry Power Station Unit Nos. 1 and 2, Oct 1, 1980
Revision to Response to Safety Evaluation Report for Environmental Qualification of Safety Related Electrical Equipment Cable Terminations and Splices I.E. Bulletin 79-01B 90-Day Review Surry Power Station Unit 2, Feb 24, 1982
Safety Evaluation Report by the Office of Nuclear Reactor Regulation Equipment Qualification Branch for Virginia Electric and Power Company Surry Power Station Units 1 and 2, May 21, 1981
Safety Evaluation Report by the Office of Nuclear Reactor Regulation Equipment Qualification Branch for Virginia Electric and Power Company Surry 1, Environmental Qualification of Safety-related Electric Equipment, Jan 26, 1983
SDBD-SPS-EP, System Design Basis Document for Emergency Power System Surry Power Station, Rev. 19
SDBD-SPS-NI, System Design Basis Document for Nuclear Instrumentation System Surry Power Station, Rev. 15
SDBD-SPS-RC, System Design Basis Document for Reactor Coolant System, Rev. 21
SDBD-SPS-RC, System Design Basis Document for Reactor Coolant System Surry Power Station, Rev. 21
SDBD-SPS-SI, System Design Basis Document for Safety Injection System, Rev. 22
SU-09-0035, Unit 1 Loop C Hot Leg RTD Lead Swap / Unit 1, May 10, 2009
SU-EQUAL-000-38, Surry Environmental Zone Description Units 1 & 2, Rev. 28
SU-EQUAL-000-PQE-04.03-P02, Rev. 0
Technical Evaluation Report Environmental Qualification of Safety-Related Electrical Equipment Surry Power Station Units 1 and 2 Response to NRC Letters of January 26, 1983 and April 4, 1983, Justification for Continued Operation, May 20, 1983
Technical Evaluation Report Review of Licensees' Resolution of Outstanding Issues from NRC Equipment Qualification Safety Evaluation Reports (F-11 and B-50), Virginia Electric and Power Company Surry Power Station Unit 2 Vol. 1 of 2, Dec 22, 1982
Technical Evaluation Report Review of Licensees' Resolution of Outstanding Issues from NRC Equipment Qualification Safety Evaluation Reports (F-11 and B-50), Virginia Electric and Power Company Surry Power Station Unit 2 Vol. 2 of 2, Dec 22, 1982
Technical Evaluation Reports Environmental Qualification of Safety Related Electrical Equipment Surry Power Station Units 1 and 2, Unit 1 Response Justification for Continued Operations, Feb 23, 1983

Technical Evaluation Reports Environmental Qualification of Safety Related Electrical Equipment Surry Power Station Units 1 and 2, Mar 9, 1983
Virginia Electric and Power Company North Anna Power Station & Surry Power Station Compliance with 10 CFR 50.49(b)(2), Dec 1, 1983
Virginia Electric and Power Company Surry Power Station Resolution of SER's for Environmental Qualification of Safety-Related Electrical Equipment, Jan 11, 1985
Virginia Power Surry Power Station Units 1 and 2 Certification of Compliance to 10 CFR 50.49, Feb 1, 1985
WCAP 8754, Environmental Qualification of Class 1E Motors for Nuclear Out-of-Containment Use, Rev. 1
WCAP-8687, Supplement 2-A02A, Equipment Qualification Test Report Westinghouse LMD Motor Insulation (Environmental Testing), Rev. 2