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

March 1, 2018

Mr. Timothy S. Rausch
Senior Vice President and
Chief Nuclear Officer
Susquehanna Nuclear, LLC
769 Salem Blvd. - NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT 05000387/2018010 AND 05000388/2018010

Dear Mr. Rausch:

On February 9, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of the Environmental Qualification Program implementation at Susquehanna Steam Electric Station (SSES), Units 1 and 2. The NRC inspectors discussed the results of this inspection with Mr. Derek Jones, Plant Manager and other members of your staff. The results of this inspection are documented in the enclosed report.

No NRC-identified or self-revealing findings were identified during this inspection. However, inspectors' documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Susquehanna Steam Electric Station.

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 the NRC's Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Glenn T. Dentel, Chief
Engineering Branch 2
Division of Reactor Projects

Docket Numbers: 50-387 and 50-388
License Numbers: NPF-14 and NPF-22

Enclosure:
Inspection Report 05000387/2018010 and 05000388/2018010

c w/encl:
Distribution via ListServ

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT 05000387/2018010 AND 05000388/ 2018010 DATED MARCH 1, 2018

DISTRIBUTION w/encl: (via e-mail)
DCollins, RA (R1ORAMAIL)
DLew, DRA (R1ORAMAIL)
MGray, DRP (R1DRPMAIL)
DPelton, DRP (R1DRPMAIL)
JYerokun, DRS (R1DRSMAIL)
BWelling, DRS (R1DRSMAIL)
JKrafty, BC
SBarber, DRP
LMicewski, SRI
TDaun, DRP, RI
DKern, DRS
GDentel, DRS
CBickett, DRS
AGould, DRP, AA
JBowen, RI, OEDO
RidsNrrPMSusquehanna Resource
RidsNrrDorlLpl1 Resource
ROPreports Resource

DOCUMENT NAME: G:\DRS\Engineering Branch 2\Kern\2018 Inspections\SUSQ DBAI-EQ IR 2018010.docx ADAMS ACCESSION NUMBER: ML18064A105

☑ SUNSI Review		☑ Non-Sensitive ☐ Sensitive		☑ Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DRS	RI/DRP	RI/DRS		
NAME	DKern	JKrafty	GDentel		
DATE	2/16/18	2/28/18	3/01/18		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Nos.	50-387 and 50-388
License Nos.	NPF-14 and NPF-22
Report No.	05000387/2018010 and 05000388/2018010
Enterprise Identifier:	I-2018-010-0020
Licensee:	Susquehanna Nuclear, LLC (Susquehanna)
Facility:	Susquehanna Steam Electric Station, Units 1 and 2
Location:	Berwick, Pennsylvania
Dates:	January 22, 2019 through February 9, 2018
Inspectors:	D. Kern, Senior Reactor Inspector, Division of Reactor Safety (DRS) J. Brand, Reactor Inspector, DRS S. Elkhiamy, Reactor Inspector, DRS
Approved By:	G. Dentel, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Talen's performance at Susquehanna Steam Electric Station, Units 1 and 2 by conducting an engineering programs design bases assurance inspection of environmental qualification program implementation 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. A licensee-identified non-cited violation is documented in report section 71111.21N.

List of Findings and Violations

None.

Additional Tracking Items

None.

INSPECTION SCOPES

This inspection was 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, 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)

Programs (Environmental Qualification) (9 Samples)

The inspectors evaluated environmental qualification program implementation by reviewing the licensed environmental qualification requirements for the following components and a sample of their associated subcomponents from January 22, 2018 to February 9, 2018:

1) Unit 2, Main Steam Line 'D' Safety Relief Valve (PSV241F013K) [Crosby pilot solenoid valve, Target Rock process solenoid valve, cable splice assembly, cable, and electrical connector]
2) Unit 1, Main Steam Line 'B' Inboard Isolation Valve (HV141F022B) [process air solenoid valve, electrical connector, cable, containment penetration, cable splice assembly, and limit switches]
3) Unit 2, HPCI Steam Line Drain Valve to Condenser Solenoid Valve (SV25528) [AVCO solenoid valve and cable]
4) Unit 1, HPCI Injection Valve Actuator (HV155F006/ACT) [valve actuator, cable, electrical connectors, wires, terminal blocks, and insulated wire]
5) Unit 1, Drywell Area Unit Cooler Motor (1VM414B) [motor, power and control cables, cable splice assembly, and containment penetration]
6) Unit 2, Reactor Building Emergency Safeguards System Division 1 480v Motor Control Center (2B216) and associated RHR Pump 'A' Suppression Pool Suction Valve HV-251F004A Breaker (2B216032) [motor control center, fuse, distribution and control panels, cables, relay, breaker, and transformer]
7) Unit 1, Reactor Vessel Water Level Emergency Core Cooling System Actuation Instrument (LISB211N031B) [differential pressure switch and insulated wire]
8) Unit 2, Drywell Automatic Depressurization System Permissive/Reactor Core Isolation Cooling Vacuum Breaker Isolation Pressure Instrument (PSE112N010A) [pressure switch, insulated wire, and cable splice assembly]
9) Unit 2, Residual Heat Removal Loop 'B' Flow Transmitter (FTE112N015B) [pressure transmitter and control wire]

INSPECTION RESULTS

Licensee Identified Non-Cited Violation	IP 71111.21N
This violation of very low safety significant was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: 10CFR 50.49(e)(5) requires, in part, that the electrical equipment qualification program must replace or refurbish the equipment at the end of its designated life. Contrary to the above, on November 16, 2017, the licensee identified that thirteen Unit 1, NAMCO limit switches in environmentally qualified (EQ) applications inside primary containment were not installed in their fully qualified configuration. Specifically, contrary to vendor instructions and EQAR-004 requirements, the limit switches for several containment isolation valves (CIV) have had their covers removed and reinstalled without replacing the gasket and cover screw O-rings. For this application, opening and/or removing the limit switch gasket /and cover screws O-ring constituted the end of the gasket/O-ring designated life. Significance/Severity Level: The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that the finding was of very low safety significance (Green), because the limit switches provide only an open or closed signal indication in the main control room, so that operators are aware of the valve position, and can make appropriate assessment of plant conditions. The safety function of the containment isolation valves was not affected. Corrective Action Reference: CR-2017-19520	

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On February 9, 2018, the inspector presented the design bases assurance inspection results to Mr. Derek Jones, and other members of the licensee's staff.

DOCUMENTS REVIEWED

71111.21N

Procedures

C-1065, Nuclear Engineering Specification for Limitorque MOV Qualification Inspection, Revision 10
GDG-03, Environmental Qualification of Class 1E Equipment, Revision 11
GDS-09, EQ Program Scope Determination, Revision 5
GDS-15, Structure and Content Development of Environmental Qualification Binders, Revision 6
IP-ENG-001, Standard Design Process, Revision 0
MT-GE-028, Target Rock Solenoid Valve Position Indication Maintenance, Revision 12
MT-GE-039, Circle Seal Solenoid Valve Maintenance, Revision 6
MT-GM-050B, Limitorque Type SMB-0 through SMB-4 and SB-3 Operator Maintenance, Revision 6
NDAP-QA-1102, Environmental Qualification (EQ) Program, Revision 7

Condition Reports (* denotes NRC identified during this inspection)

CR-1553980	2015-30721	2017-08444
CR-1676974	2015-31063	2017-17932
CR-1679402	2015-31069	2017-19520
CR-1685293	2015-31081	2017-21123
2014-17580	2015-31219	2018-01834*
2014-18118	2016-03538	2018-01855*
2015-03897	2016-24125	2018-02529*
2015-27887	2017-06425	2018-02579*
2015-30092	2017-06438	2018-02581*

Work Orders

0260125	0814983	1798333
0299902	0832372	1810495
0332987	1286746	1810498
0379219	1555215	1828221
0638817	1604740	1835728
0757817	1725451	1842745
0796179	1745840	1939352
1939354		
1947297		
1949571		
1979941		
2044927		

Calculations, Analysis, and Engineering Evaluations

EC-EQQL-0501, LOCA/Post-LOCA Environments in Primary Containment for Environmental Qualification, Revision 3
EC-EQQL-0505, Design Basis for Environmental Qualification of Equipment for High Energy Line Breaks, Revision 3
EC-EQQL-0512, Bases for Inclusions of Deletions from the EQ Program, Revision 2
EC-EQQL-0518, EQ Basis for Class 1E Pilot Solenoid Valves in Harsh Environment, Revision 0
EC-EQQL-0612, Crosby SOV Internal Temperature, Revision 0
EC-EQQL-0793, MSIV Limit Switch Heat Rise, Revision 3

EC-EQQL-1004, Validation of Actual Temperature Data Files and RAP-005A Processing for Temperature Data Collected Between 9/86 and 2/94, Revision 3
EC-EQQL-1005, Qualification Life of Various EQ Equipment Based on Actual Room Temperature Data, Revision 8
EC-EQQL-1012, Limitorque MOV Limit Switch Compartment Temperature Analysis, dated 4/21/98
EC-EQQL-1015, Radiation Qualified Life Calculation, Revision 10
EC-EQQL-1018, Determination of Target Rock SOV Operating Temperatures, Revision 0
EC-THYD-1053, Drywell Temperature in the Area of the MSIV Operators-Equipment, Revision 1
EQAR-089, Terminal Blocks used in Limitorque Motorized valve actuators installed outside primary containment, Revision 7
EQAR-001, Target Rock Solenoid Operated Valves, Revision 14
EQAR-001, Exhibit 001K, Teleconferences between PP&L and Target Rock Company dated 1988 to 1990
EQAR-001, Exhibit 001R, Non-Metallic Materials in Target Rock Valve Model 75KK-210 Report No. TRP5321A, Revision A, dated 5/30/91
EQAR-001, Exhibit 001S, Equipment Qualification Data Bank, Material Thermal Data Records, Revision 0
EQAR-004, NAMCO Limit Switches, Revision 14
EQAR-005, Rockbestos Firewall III Chemically and Irradiation Cross-Linked Polyethylene, 600V Power, Control and Instrumentation Cable, and Firewall SIS 600V Switchboard Wire, Revision 13
EQAR-008, EGS Multipin Quick Disconnect Connectors, Revision 20
EQAR-009, EGS Grayboot Connectors, Revision 11
EQAR-012, BIW Power and Control Cable Bostrad 7E, Revision 6
EQAR-027, Drywell Unit Cooler Fan Motors and CRD Area ventilation fan motors, Revision 8
EQAR-029, ITT Cannon Circulator Connectors, Revision 5
EQAR-032, Westinghouse low voltage power, control and instrumentation electrical penetration assemblies, Revision 9
EQAR-048, GE 600 Volt Vulkene-insulated panel wire, Revision 7
EQAR-053, Static O-Ring Pressure Switches, Revision 6
EQAR-055, ITT Barton Differential Pressure Indicating Switches, Revision 9
EQAR-056, GE RHR Pump Motors, Revision 10
EQAR-061, Raychem Splice Assemblies, Revision 18
EQAR-065, American Insulated Wire (AIW) Corporation EPR Insulated 600 Volt Power and Control Cable, Revision 7
EQAR-068, Kerite HTK Insulated/NS Jacketed 5 KV Power Cable, Revision 6
EQAR-070, Anaconda Wire and Cable Company, Revision 9
EQAR-072, Eaton Corporation Samuel Moore and Company 600V Instrument and 300V Thermocouple Cable EPDM Insulation and Hypalon Jacket, Revision 7
EQAR-080, Main Steam Isolation Valve Actuators, Atwood and Morrill Model No. 21190-H-26 (MSIV) Automatic Valve Corporation Model No. C-5140 (Control Assembly), Revision 16
EQAR-081, Crosby Pilot Solenoid Valve, Revision 9
EQAR-081, Exhibit 081I, Wyle Test Report, SRV Recertification Test Program on Eight Crosby 6R10 Valves for PP&L Company dated 2/17/93
EQAR-083, Rosemount Model 1153 Series B Pressure Transmitters, Revision 10
EQAR-091, Thomas and Bettis Crimped Wire Joint Model RC6, Revision 6
EQAR-104, Anaconda Wire and Cable Company Insulated Wire, Revision 3
EQAR-111, AVCO Direct Acting Solenoid Valve Model U0203GBBR-DE, Revision 2
EQAR-110, GE RHR Pump Motors Replacement Motors, Revision 7
EQAR-090, Raychem Flamtrol 600V Control Wire, Revision 9
EQAR-023, Eaton Corporation/Cutler Hammer Unitrol MCCs and Distribution Panels, Revision 24

EQAR-114, NLI Supplied Motor Control Centers, Revision 7
EQAR-107, Gould Shawmut Fuses, Revision 5
EQAR-051 Potter and Brumfield MDR Series Relays, Revision 22
EQAR-040, COMSIP Customline and magnetics Control Panels, Revision 16

Vendor Test Reports

Wyle Labs Test Report No. 17514-1, Revision A, MSIV Pneumatic Control Manifold for DECO, PP&L, CECO and Automatic Valve Corporation, March 15, 1985
30720-99-159, Wyle Labs, Nuclear Environmental Qualification Test Program on a General Electric CR151A6 Terminal Block for use in 125 VDC Control Circuits in Nuclear Operating Stations, dated 4/10/91
NEDE-30671, GE Qualification Test Report Environmental Testing of the MSIV Limit Switches, dated 11/9/84
NAMCO Qualification Test Report QTR155, Generic Qualification of NAMCO EA180 Series Limit Switches for Use in Nuclear Power Plant, Class 1E Application in Compliance with IEEE Standards 323-1974, 382-1972, and 344-1975, Revision 2, dated October 1999, Cover Sheet Date 5/3/91
NAMCO Qualification Test Report QTR180, Generic Qualification of NAMCO EA740 Series Limit Switches for Use in Nuclear Power Plant, Class 1E Application in Compliance with IEEE Standards 323-1974, 382-1972, and 344-1975, Revision 1, dated December 1999

Drawings and Wiring Diagrams

C4988-38, Junction Box UTL, dated 10/12/98
C5140-350, Sht. 1, Airpack Susquehanna 1&2 PPL UMS Model C5140-350, Revision 3
C5140-350, Sht. 2, Airpack Susquehanna 1&2 PPL UMS Model C5140-350, Revision 5
C6930-010, Sht. 1, MFD 125 VDC/120/60 MSIV UMS, Revision BE, dated 7/15/13
C6930-010, Sht. 2, Manifold MSIV Series UTL, dated 3/26/99
C6930-010, Sht. 3, Manifold MSIV Series UTL, dated 8/28/95
D107302, Sht. 80, Unit 2 Residual Heat Removal Instrumentation Block Diagram, Revision 8
D107321, Sht. 4, Unit 2 Containment Instrument Gas Compressor Suction Isolation Valve, Revision 23
D107329, Sht. 5, Unit 2 ADS & Safety Relief Valves Block Diagram, Revision 7
D107329, Sht. 6, Unit 2 ADS Control and Power Distribution Block Diagram, Revision 5
D177309, Sht. 7, Unit 2 Residual Heat Removal System NSSS Loop Diagram, Revision 3
E105941, Sht. 1, Unit 2 Nuclear Boiler, Revision 53
E105941, Sht. 2, Unit 2 Nuclear Boiler, Revision 19
E105951, Sht. 1, Unit 2 Residual heat Removal, Revision 63
E105951, Sht. 3, Unit 2 Residual heat Removal, Revision 28
E105951, Sht. 5, Unit 2 Residual heat Removal, Revision 2
E105955, Sht. 1, Unit 2 P&ID High Pressure Coolant Injection, Revision 46
E106246, Sht. 1, Unit 1 P&ID Nuclear Boiler, Revision 54
E106247, Sht. 1, Unit 1 Nuclear Boiler Vessel Instrumentation, Revision 54
E106247, Sht. 2, Unit 1 Nuclear Boiler Vessel Instrumentation, Revision 17
E106282, Unit 1 Drywell Air Flow, Revision 14
E106292, Unit 1 Reactor Building Chilled Water, Revision 1
E106260, Unit 1 High Pressure Coolant Injection, Revision 59
E106451, Reactor Building Cooling and Ventilation, Revision 13
E107158, Single Line Meter and relay Diagram 480V MCC 2B216, Revision 26
E162798, Sht. 1, Unit 2 Containment Instrument Gas, Revision 34
E162798, Sht. 2, Unit 2 Containment Instrument Gas, Revision 22

FF62069, Sht. 1, 26” Unit 1, Main Steam isolation Valve, Revision 2
FF62069, Sht. 2, 26” Unit 1, Main Steam isolation Valve, Revision 3
FF62069, Sht. 3, 26” Unit 1, Main Steam isolation Valve, Revision 1
FF62069, Sht. 4, 26” Unit 1, Main Steam isolation Valve, Revision 1
VNBB21-2, Sht. 1, Susquehanna S.E.S Unit 1 Main Steam Reactor Lines “A” and “B”, Revision 2

Modifications and Design Changes
EC-2100415, Baldor and Howden Motor replacements

Industry Operating Experience
NRC Information Notice 86-49, Age/Environment Induced Cable Failures, dated 6/16/86
NRC Information Notice 89-23, Environmental Qualification of Litton Veam CIR Series Electrical Connectors, dated 3/3/89
NRC Information Notice 89-30, Supplement 1, High Temperature Environments at Nuclear Power Plants, dated 11/1/90

Miscellaneous Documents
3180-40-2, Instruction Manual for 26” Main Steam Isolation Valves, Revision 6
C-1065, Limitorque MOV Qualification Inspection, Revision 10
D7179-011, Automatic Valve Airpack Installation and Maintenance, dated 10/3/06
DCP-84-3112, Unit 1, Conduit Sealing DCP, dated 5/22/86
DI-2017-04391, Environmental Qualification Program Focused Area Self-Assessment, dated 10/13/17
EC/BTT-1947423, MSIV Airpack (Revision K), Revision 0
EDU-RLY-0001, Dedication Document for P&B MDR Series Relay, Revision 9
IEEE Std 323-1974, IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations, Revision
IERP-82219, NRC Information Notice 89-63, Possible Submergence of Electrical Circuits Located Above the Flood Level Because of Water Intrusion and Lack of Drainage, dated 10/12/89
IERP-86093, NRC Information Notice 86-49, Age/Environment Induced Cable Failures, dated 7/7/86
IERP-89073, NRC Information Notice 89-23, Environmental Qualification of Litton Veam CIR Series Electrical Connectors, dated 4/4/89
IERP-89088, NRC Information Notice 89-30, High Temperature Environments at Nuclear Power Plants, dated 4/18/89
IERP-90213, NRC Information Notice 89-30, and Supplement 1, High Temperature Environments at Nuclear Power Plants, dated 12/3/91
NUREG 0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, Revision 1
Susquehanna Steam Electric Station Units 1 and 2 Updated Final Safety Analysis Report, Revision 68
Unitrol Motor Control Centers Instruction Manual