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

January 31, 2019

Mr. Bryan Hanson
Senior Vice President, Exelon Generation
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND NUCLEAR GENERATING STATION, UNIT 1 – INTEGRATED INSPECTION REPORT 5000289/2018004

Dear Mr. Hanson:

On December 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Three Mile Island, Unit 1 (TMI). On January 11, 2019, the NRC inspectors discussed the results of this inspection with Ed Callan, Site Vice President 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 the NRC 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/

Matthew R. Young, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket No. 50-289
License No. DPR-50

Enclosure:
Inspection Report 05000289/2018004
w/Attachment: Supplementary Information

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SUBJECT: THREE MILE ISLAND NUCLEAR GENERATING STATION, UNIT 1 – INTEGRATED INSPECTION REPORT 5000289/2018004

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	50-289
License Number:	DPR-50
Report Number:	05000289/2018004
Enterprise Identifier:	I-2018-004-0079
Licensee:	Exelon Generation Company
Facility:	Three Mile Island Station, Unit 1
Location:	Middletown, PA 17057
Inspection Dates:	October 1 through December 31, 2018
Inspectors:	Z. Hollcraft, Senior Resident Inspector B. Lin, Resident Inspector J. Ambrosini, Senior Emergency Preparedness Inspector J. Bridge, Nuclear Systems Engineer R. Rolph, Health Physicist C. Hobbs, Reactor Inspector C. Safouri, Project Engineer
Approved By:	M. Young, Chief Reactor Projects Branch 6 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Exelon's performance at Three Mile Island, Unit 1 by conducting the baseline inspections described in this report 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.

PLANT STATUS

Unit 1 operated at or near rated thermal power for the entire inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) 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 performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess Exelon's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) Protected system lineup during 'A' train engineered safeguards 480V under voltage trip testing on October 2, 2018
(2) Fire service piping during piping repairs downstream of valve FS-V-237 on October 2, 2018
(3) Reactor building emergency cooling water system during testing of backpressure regulation valves RR-V-5 and RR-V-6 on November 28, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the decay heat river water system on November 14, 2018.

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Fire Zone FH-FZ-5, Control Building Patio Area, 322' elevation on October 2, 2018
(2) Fire Zone FH-FZ-5, Fuel Handling Building 380' elevation on November 1, 2018
(3) Fire Zone AB-FA-2, 'B' Decay Heat Vault on October 9, 2018
(4) Fire Area DG-FA-2, Diesel Generator 'B' Building on December 3, 2018
(5) Fire Area CB-FA-2D, Control Building East Battery Charger Room on December 4, 2018

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a crew of licensed operators in the plant's simulator during licensed operator requalification training on October 16, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Auxiliary building and heat exchanger vault on December 11, 2018

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance issues:

(1) Decay river discharge valve DH-V-1A motor-operated valve (MOV) testing on October 30, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Unplanned maintenance on the fire service piping requiring excavation on October 2, 2018
(2) Elevated risk for reactor coolant dropline isolation valve DH-V-3 breaker testing on October 9, 2018
(3) 'A' decay heat system outage window on October 30, 2018

71111.15 - Operability Determinations and Functionality Assessments (3 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Operability evaluation of 'B' train nuclear service closed cooling pump NS-P-1B on October 1, 2018
(2) Operability evaluation of 'A' train decay closed cooling suction relieve valve DC-V-18A on October 11, 2018
(3) Operability evaluation of fuel handling building supply fan AH-E-10 discharge boot on October 30, 2018

71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following plant modification:

(1) Alternate reactor coolant system sampling with closure of CA-V-24

71111.19 - Post Maintenance Testing (5 Samples)

The inspectors evaluated post maintenance testing for the following maintenance/repair activities:

(1) 'A' emergency diesel generator ventilation AH-D-17 maintenance on October 2, 2018
(2) Reactor coolant drop line valve DH-V-3 circuit breaker testing on October 9, 2018
(3) 'A' decay river pump and discharge valve testing and maintenance on October 30, 2018
(4) 'A' building spray pump system outage window on November 10, 2018
(5) 'B' emergency feedwater pump planned maintenance on December 11, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (3 Samples)

(1) 'C' reactor protection system functional testing on October 1, 2018
(2) Reactor coolant dropline valve DH-V-3 breaker testing on October 9, 2018
(3) 'B' decay heat pump DH-P-1B on October 9, 2018

71114.04 - Emergency Action Level and Emergency Plan Changes (1 Sample)

The inspectors verified that the changes made to the emergency plan were done in accordance with 10 CFR 50.54(q)(3), and any change made to the Emergency Action Levels, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan. This evaluation does not constitute NRC approval.

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated the conduct of a routine Exelon emergency planning drill on October 16, 2018.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Contamination and Radioactive Material Control (1 Sample)

The inspectors observed personnel and material exiting the radiologically controlled area at the Unit 1 control point. The inspectors observed personnel monitor alarm responses. The inspectors ensured Nationally Tracked Sources were accounted for and reported as required.

71124.03 - In-Plant Airborne Radioactivity Control and Mitigation (1 Sample)

Self-Contained Breathing Apparatus (SCBA) for Emergency Use (1 Sample)

The inspectors evaluated Exelon's self-contained breathing apparatus program at Three Mile Island by reviewing maintenance records, observing control room operators, and observing the inspection an SCBA ready for issue.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification (1 Sample)

The inspectors verified licensee performance indicators submittals listed below:

(1) OR01: Occupational Exposure Control Effectiveness, October 2017 through October 2018

71152 - Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue.

Annual Follow-up of Selected Issues (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Issue Report 4061160, corrective actions to prevent recurrence following a rod drop event

INSPECTION RESULTS

Observation	71152 Semi-Annual Trend Review
The inspectors evaluated a sample of condition reports generated over the course of the past two quarters by departments that provide input to the quarterly trend reports. The inspectors determined that issues were appropriately evaluated by licensee staff for potential trends and resolved within the scope of the corrective action program. Inspectors noted an increase in the number of redundant rod control power supply failures during recent testing. The licensee also noted this increase and as an action for IR 4199429, determined that since infant mortality ended, on average one power supply has failed per year, but in 2018 four failed. The licensee is working with the vendor to determine any possible cause for this increase. The inspectors agreed with these actions and will review the results of the vendor determination.	
Observation	71152 Follow-up of selected issues
On October 10, 2017, during an ascension to full power following a refueling outage, control rod 5-7 dropped resulting in an immediate downpower and eventual shutdown for troubleshooting and repair. The root cause was determined to be inadequately addressed long term degradation of neoprene insulation on the control rod cable connections in the reactor building. The specific failed connector was replaced as an immediate corrective action and the plant restarted. A corrective action to replace seven connectors with a history of potential degradation was planned for the next forced or refueling outage. As a corrective action to prevent reoccurrence, the licensee would develop and implement inspection and testing to accurately assess the health of the cables and connectors. Due to the corrective action being to develop a program, inspectors selected it for a focused follow up problem identification and resolution (PI&R) sample to review the final plan. The licensee developed three new testing protocols to be completed on all cables during every outage: • A phase to phase and phase to neutral megger test of the control rod drive mechanism power cables from the output cabinet breakers to the connectors • Connector phase to neutral phase resistance measurements of the connectors • Durometer testing of the neoprene insulation to check hardness and indications of degradation Inspectors reviewed these new procedures and discussed plans for implementation with engineering staff. Based on the approval of these procedures, inspectors determined that the intent of the original corrective action to prevent reoccurrence appears to have been met. The inspectors also noted the licensee has implemented other contingencies to replace the connectors if the original action is not effective.	

EXIT MEETINGS AND DEBRIEFS

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

- On January 11, 2019, the inspector presented the quarterly resident inspector inspection results to Ed Callan, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

71111.04: Equipment Alignment

Procedures
1104-45B, Fire Service Water System, Revision 107
OP-TM108-117-1001, TMI Protected System Equipment Program, Revision 4
OP-TM-534-901, Reactor Building Emergency Cooling Operations, Revision 14
OP-TM-534-000, Reactor Building Emergency Cooling Water System, Revision 5
OP-TM-534-210, IST of RR-V-5 and RR-V-6, Revision 2

Issue Report
4199723

Work Orders
4833884 4824286

Miscellaneous
IE-534-28-001, Reactor Building Emergency Cooling Water System Diagram, Revision 2

71111.05: Fire Protection

Procedures
AB-FZ-2, Aux. Building Elevation 261', 'B' DH Vault & 'B' BS Vault Pre-Fire Plan, Revision 2
FH-FZ-5, Fuel Handing Building Elevation 322'; Control Building Patio Area, Revision 7
FH-FZ-5, Fuel Handling Building Elevation 380' Pre-Fire Plan, Revision 3
FH-FZ-5A, Fuel Handling Building Elevation 380' Pre-Fire Plan, Revision 3
FH-FZ-5B, Fuel Handling Building Elevation 380' Pre-Fire Plan, Revision 3
DG-FA-2, Diesel Generator Building EG-Y-1B Pre-Fire Plan, Revision 6
CB-FA-2D, Control Building Elevation 322' "A" Inverter Room Pre-Fire Plan, Revision 7

Issue Report
4184153

Miscellaneous
990-1745, Three Mile Island Unit No. 1 Fire Hazards Analysis Report, Revision 28
ESDS #: 2007-002, Equipment Storage Data Sheet for Scaffold Material Storage for EG-Y-1B Maintenance, Revision 1
1-FHA-035, Fire Area Layout for Control Room Tower El. 322' and 338', Revision 17
1-FHA-044, Fire Area Layout for Diesel Generator Building, Revision 1
1-FHA-045, Fire Area Layout for Diesel Generator Building, Revision 1

71111.11: Licensed Operator Requalification Program

Miscellaneous
TQ-TM-104EP-2018, EP Drill 2018, October 9, 2018

71111.12: Maintenance Effectiveness

Work Order
4352176

Miscellaneous
2705855-05, Internal Flooding Design Review, Revision 1
Topical Report 160, Maintenance Rule Structures In-Scope Inspection Report for Auxiliary Building and Heat Exchanger Vault – CMT 614975, Revision 2

71111.13: Maintenance Risk Assessments and Emergent Work Control

Work Order
4833884

Miscellaneous
Excavation Permit for FS-V-237 and piping repairs and replacement

71111.15: Operability Determinations and Functionality Assessments

Procedures
OP-TM- 543-000, Decay Heat Closed System, Revision
SM-AA-300-1001, Procurement Engineering Process and Responsibilities, Revision 23

Issue Reports
4180725 2453613 0175850 4189938

Miscellaneous
Operability Evaluation for Decay Closed Valve 18A, Decay Closed Pump 1A Suction Relief Valve, Revision 1
CGD-T1-99-0001, Commercial Grade Dedication, Revision 1
MD-H168-001, Replacement of Relief Valve Numbers Dc-V-0018A, Revision 0
990-1536, Three Mile Island Pump Head Curves, Revision 17

71111.18: Plant Modifications

Procedure
N1807.1, Reactor Coolant & Pressurizer Sampling, Revision 20A

Miscellaneous
Engineering Change # 0000626546, RCS Additional Sample Path, Revision 0
Drawing # 302-671, Liquid Sampling
Drawing # 302-660, Makeup & Purification

71111.19: Post-Maintenance Testing

Procedures
OP-TM- 212-201, IST of DH-P-1B and Valves from ES Standby Mode, Revision 16

Work Orders
195919 4352176 4817669

71111.22: Surveillance Testing

Procedures
1303-4.2C, RPS Chanel C CRD Breaker and Test Module Testing, Revision 25
E-21, Thermal Overload Device Inspection and Testing, Revision 43
E-62.2, Molded Case Circuit Breaker and Replacement, Revision 6
OP-TM-543-202, IST of DC-P-1B, Revision 4
OP-TM-642-241, ES 480V UV Trip Test – Train A, Revision 4

Issue Report
4179109

Work Orders
4770133 195919

71114.06: Drill Evaluation

Miscellaneous
TQ-TM-104EP-2018, EP Drill 2018, October 9, 2018

71114.04: Emergency Action Level and Emergency Plan Changes

Evaluation 18-02, EP-AA-111/EP-CE-111, Emergency Classification and Protective Action Recommendations, Revision 21-04
Evaluation 18-09, Drill and Exercise Procedure Changes
EP-AA-122-100, Drill and Exercise Planning and Scheduling, Revision 008
EP-AA-122-100-F-08, Pre-Exercise and NRC Exercise Checklist, Revision F
EP-AA-122-100-F-09, Off-Year Exercise Checklist, Revision D
EP-AA-122-100-F-10, Focus Area or Station Only Drill Checklist, Revision E
EP-AA-122-100-F-12, Hostile Action Based Exercise Checklist, Revision D
EP-AA-122-100-F-13, Call in Drill (CID) Checklist, Revision F
EP-AA-122-100-F-14, Drive in Drill (DID) Checklist, Revision F
EP-AA-122-300-F-01, Drill and Exercise Evaluation Criteria, Revision J
EP-AA-122-300-F-02, Drill and Exercise Objective Evaluation Summary, Revision F
Evaluation 18-75, TQ-AA-113, ERO Training and Qualification, Revision 34

71124.01: Radiological Hazard Assessment and Exposure Controls

Procedures
NISP-RP-007, Control of Radioactive Material, Revision 0
RP-AA-503-F-01, Unconditional Release Instructions Using the Small Articles Monitor (SAM) for Personal Items Used in the Radiologically Controlled Area (RCA) and in a Contaminated Area, Revision 004

Issue Reports
4147377 4168750 4175170 4186607

71124.03: In-Plant Airborne Radioactivity Control and Mitigation

Procedures
NISP-RP-003, Radiological Air Sampling, Revision 0
RP-AA-301, Radiological Air Sampling Program, Revision 11
RP-AA-825, Maintenance, Care and Inspection of Respiratory Protection Equipment, Revision 8
RP-AA-825-101, Monthly Inspection and Maintenance of MSA Firehawk Mask Mounted Regulator SCBAs, Revision 0
RP-AA-825-101-1001, Operation and Use of the MSA Firehawk Self-Contained Breathing Apparatus, Revision 0

Issue Reports
4167532 4179512

71152: Problem Identification and Resolution

Procedures
1420-CRD-2, CRD Stator or Power Cable Troubleshooting and Repair, Revision 14
E-11, CRDM Resistance and Megger Readings, Revision 18
PI-AA-125, Corrective Action Program (CAP) Procedure, Revision 4

Issue Reports
4061160 4189938 4199429