



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

August 2, 2018

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 STATION, UNIT 1 – INTEGRATED INSPECTION  
REPORT 5000289/2018002

Dear Mr. Hanson:

On June 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Three Mile Island, Unit 1 (TMI). On July 13, 2018, 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 05000289/2018002

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SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – INTEGRATED INSPECTION  
REPORT 5000289/2018002 DATED AUGUST 2, 2018

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Number: 50-289

License Number: DPR-50

Report Number: 05000289/2018002

Enterprise Identifier: I-2018-002-0075

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Inspection Dates: April 1 through June 30, 2018

Inspectors: Z. Hollcraft, Senior Resident Inspector  
J. Heinly, Senior Resident Inspector  
J. Brand, Reactor Inspector  
B. Lin, Resident Inspector  
R. Rolph, Health Physicist

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 began the inspection period at 100 percent power and operated at full power until May 21, 2018. On that date the unit was directed by the load dispatcher to lower power to 86 percent for load following. The unit shortly returned to 100 percent on the same date and continued at full power through the remainder of the 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

### 71111.01 - Adverse Weather Protection

#### Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate AC power systems on May 15, 2018.

#### Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal high temperatures on May 15, 2018.

#### External Flooding (1 Sample)

The inspectors evaluated readiness to cope with external flooding during the week of June 11, 2018.

### 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 on the 'B' train of control building ventilation on April 5, 2018
- (2) Protected system lineup during a scheduled maintenance on the 'A' emergency diesel generator on April 24, 2018

- (3) Protective system lineup during schedule replacement of emergency safeguards actuation system relay on May 21, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the Unit 1 emergency diesel generators and the engineered safety feature actuation system on May, 18, 2018.

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

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

- (1) CB-FA-3C, emergency safeguards actuation system room on April 6, 2018
- (2) TB-FA-1(5), turbine building elevation 322' on April 10, 2018
- (3) AB-FZ-2, 'B' decay heat vault on April 10, 2018
- (4) AB-FZ-2, 'B' building spray vault on April 16, 2018
- (5) DG-FA-1, diesel generator building on April 18, 2018

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the control building areas during the week of June 11, 2018.

Cables (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) Cable vault E-18 on June 12, 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 June 5, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated reactivity change management for load following on May 21, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (2 Samples)

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

- (1) Floor drain systems on May 31, 2018
- (2) 480 VAC electrical distribution system on June 29, 2018

#### 71111.13 - Maintenance Risk Assessments and Emergent Work Control (6 Samples)

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

- (1) Elevated (Yellow) risk for planned work in the Unit 1 substation on April 20, 2018
- (2) Planned maintenance on the 'A' emergency diesel generator on April 23, 2018
- (3) Planned maintenance on the engineered safeguards actuation system on May 21, 2018
- (4) Emergent maintenance on control building return ventilation fan (AH-E-19A) on May 29, 2018
- (5) Emergent maintenance on the DC rod drive control system on May 30, 2018
- (6) Emergent maintenance on 'A' emergency diesel generator's oil filter gasket on May 31, 2018

#### 71111.15 - Operability Determinations and Functionality Assessments (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Inservice testing trend on the 'B' nuclear service cooling pump on April 11, 2018
- (2) Cavitation on "A" emergency diesel generator standby cooling pump on May 7, 2018
- (3) Make up system gauge MU22-PI3 missing piping support on May 2, 2018
- (4) 'A' control building return ventilation fan (AH-E-19A) motor control failure on May 30, 2018
- (5) DC rod drive control system (B power supply for mechanism 9) redundant power supply failure on May 30, 2018
- (6) 'A' emergency diesel generator lubricating oil filter gasket leak on May 31, 2018

#### 71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Engineering Change 622814 – DF-T-2A/B Sample Line Connections

#### 71111.19 - Post Maintenance Testing (7 Samples)

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

- (1) 'A' emergency diesel generator air start compressor relief valve EG-V-1A replacement on April 4, 2018
- (2) 'A' emergency diesel planned maintenance period on April 25, 2018
- (3) 'A' nuclear service water outlet isolation valve NS-V-26A internals on May 8, 2018
- (4) Engineered safeguards actuation system relay replacement on May 22, 2018
- (5) 'A' train control building ventilation exhaust fan AH-P-19A motor controller transformer repair on May 29, 2018
- (6) DC rod drive control system (B power supply for mechanism 9) on May 30, 2018
- (7) 'A' emergency diesel following oil filter gasket replacement on May 31, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (3 Samples)

- (1) 'C' RPS functional testing on April 6, 2018
- (2) Emergency feedwater block and control valve on April 26, 2018
- (3) 'B' building spray on April 16, 2018

Inservice (1 Sample)

- (1) 'B' Decay Heat Pump IST on April 10, 2018

**RADIATION SAFETY**71124.01 - Radiological Hazard Assessment and Exposure ControlsRadiological Hazard Assessment (1 Sample)

The inspectors reviewed recent plant radiation surveys for radiological work activities. The inspectors evaluated assessments and controls for new radiological hazards.

Instructions to Workers (1 Sample)

The inspectors evaluated instructions provided to workers.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated in-plant radiological conditions during facility walk-downs and observation of radiological work activities. The inspectors assessed whether posted surveys, radiation work permits, worker radiological briefings, the use of continuous air monitoring and dosimetry monitoring were consistent with the present conditions.

High Radiation Area and Very High Radiation Area Controls (1 Sample)

The inspectors evaluated risk-significant high radiation area and very high radiation area controls including postings and physical barriers.

Radiation Worker Performance and Radiation Protection Technician Proficiency (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician radiological performance.

71124.02 - Occupational As Low As is Reasonably Achievable Planning and ControlsVerification of Dose Estimates and Exposure Tracking Systems (1 Sample)

The inspectors evaluated dose estimates and exposure tracking.



Radiation Worker Performance (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance.

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

The inspectors evaluated engineering controls for in-plant airborne radioactivity.

71124.04 - Occupational Dose AssessmentExternal Dosimetry (1 Sample)

The inspectors reviewed dosimetry NVLAP accreditation and the use of “correction factors to align electronic personal dosimeter results with NVLAP dosimetry results. The inspectors evaluated the care and storage of dosimetry.

Internal Dosimetry (1 Sample)

The inspectors evaluated Exelon’s assessments of internal dose by whole body counting, bioassay, and derived airborne concentration monitoring. The inspectors reviewed procedures, individual whole body count records, the use of respiratory protection, and internal dose assessments for any actual internal exposure.

Special Dosimetric Situations (1 Sample)

The inspectors evaluated Exelon’s training lesson plans for the risks of radiation exposure to the embryo/fetus, the monitoring program for declared pregnant workers, dose assessments performed for large dose rate gradient environments, the use of multi-badging, and skin or neutron dose assignments as available.

**OTHER ACTIVITIES – BASELINE**71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below for the period from April 1, 2017, through March 31, 2018. (2 Samples)

- (1) Unit 1 Unplanned Scrams
- (2) Unit 1 Unplanned Scrams with Complications

71152 - Problem Identification and ResolutionSemiannual 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) Condition Report 3949713, low temperature over-pressurization Technical Specification requirements were not met

### INSPECTION RESULTS

Observation	71152 Semi-Annual Trend Review
<p>The inspectors determined that, in most cases, the issues were appropriately evaluated for potential trends and resolved within the scope of the corrective action program. The inspectors noted one trend that the licensee had also identified, an adverse trend in air intake tunnel degraded conditions (IR 4100776) and a second adverse trend in immediate operability determination timeliness and quality. After discussions with the licensee, this second trend was documented in IR 4134400. The IRs for both of these trends appropriately capture the issues.</p>	
Observation	71152 Follow-up of selected issues
<p>Inspectors reviewed the licensee's cause evaluation and long term corrective actions following a violation of Technical Specification 3.1.12.1 Low Temperature Overpressure (LTOP) Protection. This violation was initially reported in LER 05000289/2017-001 and dispositioned as a licensee identified non-cited violation in TMI inspection report number 2016004. Inspectors verified that the cause evaluation level of effort was commensurate with the significance, identified the apparent causes, and appropriate corrective actions were assigned and completed. The inspectors reviewed procedures revised to include discrete steps to verify technical specification requirements are met prior to energizing make-up pumps and that training was completed prior to the 2017 1R22 outage to re-familiarize operators with these applicable technical specification requirements and infrequently used procedures. Also, inspectors verified that this training has been added to the licensee's long range training plan to ensure it will be covered regularly. These actions were all included in IR 3949713.</p>	

### EXIT MEETINGS AND DEBRIEFS

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

- On July 13, 2018, the inspector presented the quarterly resident inspector inspection results to Ed Callan, Site Vice President, and other members of the TMI staff.

**DOCUMENTS REVIEWED****71111.01: Adverse Weather Protection**Procedures

3301-SA1, Dike Inspection, Revision 17

OP-AA-108-107-1001, Station Response to Grid Capacity Conditions, Revision 3

OP-AA-108-107, Switchyard Control, Revision 2

WC-AA-107, Seasonal Readiness, Revision 17

WC-TM-8003-1009, Three Mile Island unit 1 Nuclear Plant Interface Requirements (NPIRs),  
Revision 2Action/Condition/Issue/ Reports

2482633      4139286      4137916

Maintenance Orders/Work Orders

4703573

Miscellaneous

System Engineer Systems Summary Sheet/Recommendations From

Letter from Edward L. Shuttleworth, President, Metropolitan Edison Company to Mr. Thomas J.  
Dougherty, Sr. Vice President – Mid Atlantic Operations Exelon Generation, May 14,  
2018, Switchyard Readiness Certification for Summer 2018**71111.04: Equipment Alignment**Procedures

CC-AA-201, Plant Barrier Control Program, Revision 12

OP-TM-108-108-117-1001, Three Mile Island Protected Equipment Program, Revision 4

Action/Condition/Issue/ Reports

04129755      04129849      04129850      04130549      04130552

Maintenance Orders/Work Orders

04602499      04602501      04725735      04734722      04759474      04769003

R2097461      R2156401      R2163637      R2239285

Miscellaneous

2008-017-002, NDE Data Report, Muffler Exam for the EG-Y-1A Diesel, completed 4/2/2008

1303-4.16, Emergency Power System Monthly Surveillance Test, completed 4/11/18

1107-03, Diesel Generator Operating Procedure, completed 4/24/18

TMI Emergency Diesel Generator Engaged Health Report

**71111.05: Fire Protection**Procedures

Pre-fire plan for the Control Bldg. Elev. 338'-6", ESAS room, Revision 5

Pre-fire plan for Auxiliary Bldg. Elev. 261', Area AB-FZ-2, Revision 2

Pre-fire plan for Turbine Bldg. Elev. 322', Area TB-TB-1 (5), Revision 12

Pre-fire plan for Diesel Building, EG-Y-1A Room and Control Panel, Area DG-FA-1, Revision 6

Action/Condition/Issue/ Report  
4126280

Miscellaneous  
990-1745, TMI-1 Fire Hazards Analysis Report, Revision 26

**7111.06: Flood Protection Measures**

Procedures  
OP-TM-AOP-0021, Flood Basis Document, Revision 11A  
SDBD-T1-122, System Design Basis Document for Flood Protection Systems, Revision 5

Maintenance Order/Work Order  
4703573

Miscellaneous  
TMI-1 FSAR, Revision 24

**7111.11: Licensed Operator Requalification Program**

Procedures  
OP-AP-300-1003, Power Reactivity Maneuver, Revision 10  
1102-4, Power Operations, Revision 137

Miscellaneous  
TQ-TM-LRU-106-5024, TMI Operational Simulator Examination Scenario, Revision 2

**7111.12: Maintenance Effectiveness**

Procedures  
ER-AA-310-1005, Maintenance Rule – Dispositioning Between (a)(1) and (a)(2), Revision 7  
ER-AA-310, Implementation of the Maintenance Rule, Revision 11

Action/Condition/Issue/ Reports  
1015187      862948      473039

Miscellaneous  
Maintenance rule status and action plan for engineering systems 572 and 573

**7111.13: Maintenance Risk Assessments and Emergent Work Control**

Procedure  
OP-TM-108-117-1001, Three Mile Island Protected Equipment Program, Revision 4

Action/Condition/Issue/ Reports  
4142005      4142791

Maintenance Orders/Work Orders  
4751646      4753715      4749609      4789202

**7111.15: Operability Determinations and Functionality Assessments**Procedures

OP-TM-622-414, Exercising One or More Control Rods, Revision 5

OP-TM-MAP-G0304, CRD System Fault, Revision 3

MA-TM-144-101, CRD Single Rod Power Supply Power Supply Maintenance/Replacement,  
Revision 2Action/Condition/Issue/ Reports

04132306 04133629

Maintenance Orders/Work Orders

4693222 4790235

Miscellaneous

VM-TM-0191, Fairbanks Morse Diesel Engine Technical Manual, Revision 71

VM-TM-3039, Areva DCRDCS Volume 1, Revision 5

C-1101-211-5320-041, TMI-1 Makeup Tubing (MU22PI3), Revision 0

**7111.18: Plant Modifications**Procedure

CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, Revision 30

Action/Condition/Issue/ Reports

877760 877764 1012176

Maintenance Orders/Work Orders

4744955

MiscellaneousEngineering Change 0000622814, Installation of Quick Disconnects on DF-T-2A/B Drains,  
Revision 0

302-351, Emergency Diesel Generator Flow Diagram, Revision 28

**7111.19: Post-Maintenance Testing**Action/Condition/Issue/ Reports

04142005 03989283

Maintenance Orders/Work Orders

4751646 4753715 4749609 4789202

Miscellaneous

SS-209-515, Electrical Element Wiring Diagram, Engineered Safeguards, Revision 12

**7111.22: Surveillance Testing**Procedures

1303-4.2C, RPS Channel C CRD Breaker and Test Module Testing, Revision 25

OP-TM-424-212, IST of EF-V-30S and EF-V-52S, Revision 9

OP-TM-214-202, BS-P-1B Pump and Valve IST, Revision 15

OP-TM-212-202, IST of DH-P-1B and Valves from ES Standby Mode, Revision 16

Maintenance Orders/Work Orders

04736089      4695981      4735217      4739779

**71152 - Problem Identification and Resolution**

Action/Condition/Issue/ Reports

4100776      4134400      3949713