



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

May 2, 2018

EA-18-029
EA-18-038

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
5000289/2018001 AND EXERCISE OF ENFORCEMENT DISCRETION**

Dear Mr. Hanson:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Three Mile Island, Unit 1 (TMI). On April 17, 2018, the NRC inspectors discussed the results of this inspection with Mr. Ed Callan, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented a licensee identified violation which was determined to be of very low safety significance in this report. Because of the very low safety significance and because it has been entered into your corrective action program, the NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

A violation of Exelon's site-specific licensing basis for tornado-generated missile protection was identified. Because this violation was identified during the discretion period covered by Enforcement Guidance Memorandum 15-002, Revision 1, "Enforcement Discretion for Tornado Generated Missile Protection Non-Compliance" (ML16355A286), and because Exelon is implementing appropriate compensatory measures, the NRC is exercising enforcement discretion by not issuing an enforcement action and is allowing continued reactor operation.

In addition, the NRC reviewed Licensee Event Report 05000289/2017-003-00, which described the circumstances associated with the simultaneous opening of both airlock doors of the equipment hatch. The opening of both doors constitutes a violation of the Unit 1 Technical Specification 3.6.12. Inspection staff performed a risk evaluation and determined the issue was of very low safety significance (Green). Although this issue constitutes a violation of NRC requirements, the NRC determined that the failure mechanism of the containment door interlock was not within Exelon's ability to reasonably foresee and correct. As a result, the NRC did not identify a performance deficiency associated with this condition. The NRC's assessment considered Exelon's maintenance practices, industry operating experience, vendor and industry maintenance and testing recommendations, and Exelon's corrective actions.

Based on the results of the NRC's inspection and assessment, I have been authorized, after consultation with the Director, Office of Enforcement, to exercise enforcement discretion in accordance with NRC Enforcement Policy Section 2.2.4, "Exceptions to Using Only the Operating Reactor Assessment Program," and Section 3.10, "Reactor Violations with No Performance Deficiencies." The Region I Regional Administrator was also consulted regarding enforcement discretion for this issue.

If you contest the violations or significance of the non-cited violation (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 Three Mile Island.

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/

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

Docket Number: 50-289
License Number: DPR-50

Enclosure:
Inspection Report 05000289/2018001
w/Attachment: Supplementary Information

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SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – INTEGRATED INSPECTION REPORT
5000289/2018001 AND EXERCISE OF ENFORCEMENT DISCRETION DATED
MAY 2, 2018

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

Docket Number: 50-289

License Number: DPR-50

Report Number: 05000289/2018001

Enterprise Identifier: I-2017-004-0054

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Inspection Dates: January 1 through March 31, 2018

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

Approved By: M. Young, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

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. NRC and self-revealed findings, violations, and additional items are summarized in the table below. A Licensee-identified non-cited violation is documented in report section 71111.13.

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
LER	05000289/2017-004-00	Items Nonconforming to Design for Tornado Missile Protection	71153	Closed
LER	05000289/2017-003-00	Primary Containment Declared Inoperable Due to Both Airlock Doors Open Simultaneously	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at 100 percent power and remained at or near 100 percent power for 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 licensee's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Impending Severe Weather (2 Samples)

The inspectors evaluated readiness for impending adverse weather conditions:

- (1) Cold weather alert on January 14, 2018
- (2) High winds warning and alert on March 3, 2018

71111.04 - Equipment Alignment

Partial Walkdown (4 Samples)

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

- (1) Nuclear service river pump 1A on January 24, 2018
- (2) Protected system lineup during maintenance on the A control building chiller on January 25, 2018
- (3) Clearance walkdown of the C heat exchanger of the Nuclear service system during inspection and cleaning activities on February 6, 2018.
- (4) Clearance walkdown during maintenance activities on Emergency feedwater pump 2A on March 7, 2018

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

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

- (1) Intake and screen pump house area ISPH-FZ-1 on January 24, 2018
- (2) Intake and screen pump house area ISPH-FZ-2 on January 24, 2018
- (3) A Decay Heat Vault on January 31, 2018
- (4) A Building Spray Vault on February 9, 2018
- (5) Station blackout diesel area, Unit 2, on March 27, 2018

Annual Inspection (1 Sample)

The inspectors evaluated fire brigade performance on January 22, 2018.

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the air intake tunnel area during the week of January 7, 2018.

71111.07 - Heat Sink Performance

Heat Sink (1 Sample)

The inspectors evaluated D nuclear service heat exchanger performance on February 2, 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 March 14, 2018.

Operator Performance (2 Samples)

The inspectors observed and evaluated operator performance in the control room during the following two periods:

- (1) Reactor coolant make up isolation valve stroke time testing on January 26, 2018
- (2) Control rod exercising on March 6, 2018.

7111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (3 Samples)

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

- (1) Emergent down-power due to EHC leak on turbine governor valve TG-CV-2 on December 8, 2017
- (2) Nuclear services closed cooling system leakage associated with microbiologically induced corrosion on March 13, 2018
- (3) Plant upset due to blown integrated control system fuse on November 11, 2017

7111.13 - 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 risk for power operated relieve valve set point check on January 4, 2018
- (2) Emergent work to repair fire service leaks on January 19, 2018
- (3) Emergent work on the heat sink protection system pressure transmitters on January 25, 2018
- (4) Emergent work to repair air intake tunnel combustible vapor detector on February 5, 2018
- (5) Emergent work on drainage leakage on emergency safeguards actuation system relay cabinets on February 26, 2018
- (6) Emergent work on the A train once through steam generator atmospheric dump valve and B train reactor protection system module on March 28, 2018

7111.15 - Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Air intake tunnel water flood seal leakage on January 22, 2018
- (2) Control tower 338 foot elevation sewage leak onto engineered safeguards actuation system relay cabinets 2A and 2B on February 19, 2018
- (3) Heat sink protection system steam pressure transmitters on January 26, 2018
- (4) Through wall leakage on the C nuclear service cooling backwash piping on March 7, 2018
- (5) Makeup system pump and motor lube oil reservoir dropping level on March 21, 2018

7111.18 - Plant Modifications (3 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Engineering Change Package 622205 – Emergency Diesel Generator Crankcase Pressure Time Delay Setting Change on February 12, 2018
- (2) Engineering Change Package 619256 – Replacements for MSA Combustible Gas Monitors on February 14, 2018
- (3) Engineering Change Package 619362 – Replace AH-CE/CS-204A/B/C on February 14, 2018

7111.19 - Post Maintenance Testing (6 Samples)

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

- (1) Fire service leak repair near valve FS-V-224 on January 19, 2018
- (2) Train A control building chiller maintenance on January 30, 2018
- (3) Turbine driven emergency feedwater pump oiler replacement on February 9, 2018
- (4) B make up pump maintenance on February 17, 2018
- (5) Engineered safeguards actuation system relay replacement on February 26, 2018
- (6) 2A Emergency Feedwater pump maintenance on March 7, 2018

7111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (2 Samples)

- (1) Turbine driven emergency feedwater pump and valve surveillance testing on January 8, 2018
- (2) A train emergency loading sequence and high pressure injection logic channel/component test on March 20, 2018

In-service (2 Samples)

- (3) IST of the A train of the Decay Heat Pump and Valves on January 31, 2018
- (4) IST of the A train of BS Pump on February 1, 2018

Containment Isolation Valve (1 Sample)

- (5) IST of the makeup system valve, MU-V-18 on January 26, 2018

71114.02 - Alert and Notification System Evaluation (1 Sample)

The Inspectors evaluated the maintenance and testing of the alert and notification system (for the time period in question).

71114.03 - Emergency Response Organization Staffing and Augmentation System (1 Sample)

The inspectors conducted a review of the Licensee's Emergency Response Organization (ERO) augmentation staffing requirements and the process for notifying and augmenting the ERO.

71114.05 - Maintaining Emergency Preparedness (1 Sample)

The inspectors reviewed a number of activities to evaluate the efficacy of Exelon's efforts to maintain Three Mile Island's emergency preparedness programs.

71114.06 - Drill Evaluation

Drill/Training Evolution (1 Sample)

The inspectors observed a simulator training evolution and drill and exercise performance evaluation for licensed operators on March 14, 2018.

RADIATION SAFETY

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment (5 samples)

Walkdowns and Observations (1 Sample)

The inspectors walked down the gaseous and liquid radioactive effluent monitoring and filtered ventilation systems to assess the material condition and verify proper alignment according to plant design.

Calibration and Testing Program (Process and Effluent Monitors) (1 Sample)

The inspectors evaluated Exelon's gaseous and liquid effluent monitor instrument calibration and testing.

Sampling and Analyses (1 Sample)

The inspectors evaluated radioactive effluent sampling and analysis activities.

Instrumentation and Equipment (1 Sample)

The inspectors reviewed radioactive effluent discharge system surveillance test results and reviewed the methodology used to determine the radioactive effluent stack and vent flow rates based on Technical Specifications/Off Site Dose Calculation Manual (TS/ODCM) acceptance criteria.

Dose Calculations (1 Sample)

The inspectors reviewed several liquid and gaseous discharge permits to evaluate public dose calculations (monthly, quarterly, and annual) and the annual radiological effluent release reports for 2015 and 2016.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below.
(6 Samples)

- (1) Unit 1 Reactor Coolant System Specific Activity (January 2017 to December 2017)
- (2) Unit 1 Reactor Coolant System Leak Rate (January 2017 to December 2017)
- (3) Alert and Notification Reliability (April 2017 through December 2017)
- (4) Drill and Exercise Performance (April 2017 through December 2017)
- (5) Emergency Response Organization Drill Participation (April 2017 through December 2017)
- (6) Radiological Effluent TS/ODCM Radiological Effluent Occurrences (January 2016 through December 2017)

71152 - Problem Identification and Resolution

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:

Simultaneous opening of the equipment hatch inner and outer doors on September 5, 2017.

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (2 Samples)

The inspectors evaluated the following licensee event reports which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) Licensee Event Report (LER) 05000289/2017-003, Primary Containment Declared Inoperable Due to Both Airlock doors Open Simultaneously, on September 5, 2017.
- (2) Licensee Event Report (LER) 05000289/2017-004, Items nonconforming to Design for Tornado Missile protection, on December 6, 2017.

INSPECTION RESULTS

Enforcement Discretion	Enforcement Action (EA)- EA-18-029: Multiple Examples of Nonconforming to Design for Tornado Missile Protection	71153
<p><u>Description:</u> Resulting from a systematic review of plant design and licensing basis Exelon determined four nonconforming conditions where components that could be depended upon to safely shutdown the reactor were not adequately protected from tornado missiles. These conditions include diesel fuel oil and day tank vents, borated water supplies, and once through steam generator pressure control isolation valves.</p> <p><u>Corrective Action(s):</u> In accordance with the guidance in Regulatory Issues Summary 2015-06 Tornado Missile Protection (ML15020A419) and EGM 15-002, Revision 1, "Enforcement Discretion for Tornado Generated Missile Protection Non-Compliance," (ML16355A286) the licensee implemented compensatory measures to maintain the equipment in a degraded but operable condition.</p>		

These actions include verifying that procedures, training, and equipment are in place to take appropriate action in the event of a tornado watch or warning and establishing a heightened level of awareness and preparedness to tornado missile vulnerabilities. To restore full compliance, the licensee intends to evaluate the vulnerabilities utilizing approved methodologies and submitting a license amendment request per the timeline in Enforcement Guidance Memorandum 15-002, Revision 1.

Corrective Action Reference(s): Issue Reports 04081290, 04085589, 04085596, 04085607

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that the applicable regulatory requirements and the design basis for SSCs are correctly translated into specifications, drawing, procedures, and instructions.

Contrary to the above, from April 19, 1974, until December 6, 2018, Exelon failed to correctly translate the design basis for protection against tornado-generated missiles into their specifications and procedures. Specifically, Exelon did not adequately protect TMI Unit 1 diesel fuel oil and day tank vents, borated water supplies, and once through steam generator pressure control isolation valves from tornado generated missiles.

Severity/Significance: For violations warranting enforcement discretion, Inspection Manual Chapter 0612 does not require a detailed risk evaluation, however, safety significance characterization is appropriate. The NRC Enforcement Policy, Section 2.2.1 states, in part, that, whenever possible, the NRC uses risk information in assessing the safety significance of violations. Accordingly, the NRC concluded that this issue is of low risk significance based on a generic and bounding risk evaluations performed in support of the resolution of tornado-generated missile non-compliances.

Basis for Discretion: Because this violation was identified during the discretion period covered by EGM 15-002, Revision 1, and because Exelon has implemented compensatory measures, the NRC is exercising enforcement discretion, is not issuing enforcement action, and is allowing continued reactor operation.

Enforcement Discretion	Enforcement Action (EA)-18-038: Primary Containment Declared Inoperable Due to Both Airlock Doors Open Simultaneously	71153
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Description: On September 5, 2017, Three Mile Island Unit 1 was operating at 100% power and preparing for a scheduled maintenance and refueling outage. During a planned entry through the primary containment personnel airlock of the equipment hatch, the inner and outer doors were open simultaneously for less than one minute due to a failure of the interlock mechanism. The breach was immediately recognized by the operator and the inner door of the equipment hatch airlock was closed. Exelon determined the opening of both airlock doors constituted a violation of Technical Specification 3.6.12, "Personnel or emergency air locks." The event was reported under 10 CFR 50.73(a)(2)(ii)(A) due to a principal safety barrier being seriously degraded, 10 CFR 50.73(a)(2)(v)(C) as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material, and 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specification.

Corrective Actions: Corrective actions included repairing the affected portion of the interlock mechanism and retesting its operation. An extent of condition was performed on the containment personnel hatch doors resulting in no similar issues.

Corrective Action Reference(s): Issue report 04049166

Enforcement:

Violation: Three Mile Island Technical Specification 3.6.12, "Personnel or emergency air locks," states "at least one door in each of the personnel or emergency air locks shall be closed and sealed during personnel passage through these air locks."

Contrary to the above, on September 5, 2017, at least one door of a Three Mile Island Unit 1 personnel or emergency air lock was not closed and sealed during personnel passage through the air lock. Specifically, as the result of a failure of the interlock mechanism, the inner and outer equipment hatch emergency air lock doors were simultaneously opened for less than one minute.

Severity/Significance: For violations warranting enforcement discretion, Inspection Manual Chapter 0612 does not require a detailed risk evaluation, however, safety significance characterization is appropriate. The NRC Enforcement Policy, Section 2.2.1 states, in part, that, whenever possible, the NRC uses risk information in assessing the safety significance of violations. The inspectors determined that finding was of very low safety significance (Green).

Basis for Discretion: The inspectors determined that both containment hatch doors opening simultaneously was not within Exelon's ability to foresee and prevent. As a result, no performance deficiency was identified. The inspector's assessment considered previous surveillances performed on the equipment hatch doors and interlock mechanisms. The inspectors reviewed all recent surveillances performed on the equipment and personnel inner and outer doors for timeliness and any abnormal results. No abnormalities were discovered and all surveillances were completed within periodicity.

The NRC determined that it was not reasonable for Exelon to have been able to foresee and prevent this violation of NRC requirements, and as such, no performance deficiency existed. Therefore, the NRC has decided to exercise enforcement discretion in accordance with Sections 2.2.4 and 3.10 of the NRC Enforcement Policy and refrain from issuing enforcement action for the violation of technical specifications (EA-18-038). Further, because Exelon's actions did not contribute to this violation, it will not be considered in the assessment process or the NRC Action Matrix.

Observation	71152
<p>Inspectors elected to inspect the cause evaluation and corrective action determination related the issue described in LER 2017-003 as a selected annual sample. Exelon evaluated the condition and determined the cause of the event to be the failure of the outer door pawl to engage, providing a false indication that the outer door was closed prior to opening the inner door. The inspectors placed additional inspection focus to evaluate additional maintenance activities on the containment door mechanism, prior to outage activities where the door is cycled on a frequent basis with many new operators on site. Existing procedures and maintenance activities do not specify any subcomponent replacements until there is a failure or indication of damage. In addition to performing repairs to the outer door pawl, Exelon reviewed the current preventative maintenance activities for scheduling adequacy with the focus on high usage periods, evaluating additional maintenance activities that would include preventative subcomponent replacements, and reviewing industry operational experience for similar failures and corrective actions prior to the next refueling outage. Exelon documented the inspectors' observation in issue report 04049166.</p>	

Licensee Identified Non-Cited Violation	71111.13
<p>This violation of very low safety significance 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.</p>	
<p><u>Violation:</u> 10 CFR 50.63(c)(2) states, in part, that the alternate ac power source will constitute acceptable capability to withstand station blackout provided an analysis is performed which demonstrates that the plant has this capability from onset of the station blackout until the alternate ac source and required shutdown equipment are started and lined up to operate. The time required for startup and alignment of the alternate ac power source and this equipment shall be demonstrated by test. If the alternate ac source can be demonstrated by test to be available to power the shutdown buses within 10 minutes of the onset of station blackout, then no coping analysis is required. The Three Mile Island Unit 1 Station Blackout Evaluation Report 990-1879 identifies the station blackout (SBO) diesel generator as the alternate ac power source for the unit.</p>	
<p>Contrary to the above, from January 11, 2018, to January 12, 2018, the Three Mile Island Unit 1 alternate ac power source did not constitute acceptable capability to withstand station blackout. Specifically, during this timeframe, the SBO diesel generator was rendered unavailable due to fire service valve FS-V-225 being closed with no dedicated operator to reopen the valve. The time required for startup and alignment of the SBO diesel generator in this configuration had not been demonstrated by test to be available to power the shutdown buses within 10 minutes of the onset of station blackout.</p>	
<p>Significance/Severity Level: The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding required a detailed risk evaluation due it representing an actual loss of function of one non-Technical Specification train of equipment designated as high safety-significance for more than 24 hours. A Region I senior reactor analyst completed the detailed risk evaluation and estimated the increase in core damage frequency (CDF) associated with this performance deficiency to be 7E-8/yr or of very low safety significance (Green). The senior reactor analyst used the Systems Analysis Programs for Hands-On Evaluation (SAPHIRE) Revision 8.1.6, Standardized Plant Analysis Risk (SPAR) Model, Version 8.54, for evaluating the increase in risk. The analyst performed the assessment by failing the station blackout diesel generator for an exposure period of 30 hours due to its assumed unavailability. The dominant core damage sequence involved a steam line break in the turbine building (SLBTB) with a failure to isolate the steam line break, a loss of reactor coolant pump (RCP) seal cooling, failure of rapid secondary depressurization, failure of the RCP seal stage 2 integrity and failure of the High Pressure Injection mitigating function. In accordance with IMC 0609, Appendix H, "Containment Integrity Significance Determination Process," Figure 5.1, the increase in core damage frequency per year was below 1E-7/yr and therefore the Large Early Release Frequency (LERF) contribution was determined not to have an effect on the very low safety significance determination.</p>	
<p>Corrective Action Reference(s): CR 04093302</p>	

EXIT MEETINGS AND DEBRIEFS

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

- On April 17, 2018, the inspector presented the quarterly resident inspector inspection results to Mr. Ed Callan, Site Vice President, and other members of the Three Mile Island staff.

DOCUMENTS REVIEWED71111.01: Adverse Weather ProtectionProcedures

OP-AA-108-107-1001, Station Response to Grid Capacity Conditions, Revision 7
 OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 15
 OP-TM-AOP-004, Tornado/High Winds, Revision 8
 OP-TM-108-111-1001, TMI Severe Weather and Site Inaccessibility Guidelines, Revision 10
 SY-AA-101-146, Severe Weather Preparation and Response, Revision 2

Action/Condition/Issue/ Reports

4111085 4111721

71111.04: Equipment AlignmentProcedures

1103-33, Screen House Equipment, Revision 48
 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

04096706

Maintenance Orders/Work Orders

04377653

Miscellaneous

302-082, Emergency Feedwater System Flow Diagram, Revision 25
 302-203, Screen Wash and Sluice System Flow Diagram, Revision 69
 302-610, Nuclear Service Closed Cycle Cooling Water Flow Diagram, Revision 82
 eSOMS clearance 17-1-541-0012
 eSOMS clearance 17-1-424-0008

71111.05: Fire ProtectionProcedures

1038, Administrative Controls-Fire Protection Program, Revision 84
 3301-W2.2, Fire System Diesel FS-P-3 Battery Check, Revision 9
 AB-FA-1, Pre-fire Plan #2, 'A' Decay Heat Vault & 'A' Building Spray Vault, Revision 4
 CB-FA-3B, Pre-fire Plan #29, Control Building Elev. 338'6", Revision 8
 ISPH-FZ-1, Pre-fire Plan #75 for Intake Screen Pump House Elev. 308', Revision 6
 ISPH-FZ-2, Pre-fire Plan #76 for Intake Screen Pump House Elev. 308', Revision 6
 OP-MA-201-007, Fire Protection System Impairment Control, Revision 7
 OP-AA-201-003, Fire Drill Performance, Revision 16
 Pre-Fire Plan #72, SBO Elevation 305 FT, Revision 2

Miscellaneous

990-1745, TMI Fire Hazards Analysis Report, Revision 6
 Drill Scenario for January 22, 2018

71111.06: Flood Protection Measures

Action/Condition/Issue/ Reports

04091488

Miscellaneous

SDBD-T1-122, System Design Basis Document for Flood Protection Systems, Revision 5

71111.07: Heat Sink Performance

Maintenance Orders/Work Orders

R2234971

Miscellaneous

NRC Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment, dated January 18, 1989
NS-C-1D, Nuclear Services Closed Cooler, Eddy Current Examination Report, January 28, 2016

71111.11: Licensed Operator Requalification Program

Procedures

HU-AA-1211, Pre-Job Briefings, Revision 011
OP-AA-103-102, Watch-standing Practices, Revision 016
Op-AP-300-1001, PWR Control Rod Movement Requirements, Revision 4
OP-TM-211-204, IST of MU-V-36 and MU-V-37, Revision 3
OP-TM-211-242, MU-V-18 Stroke Time Test for IST, Revision 8
OP-TM-622-414, Exercising One or More Control Rods, Revision 5
OS-24, Conduct of Operations during Abnormal and Emergency Events, Revision 30

Miscellaneous

11.7.10.002, TMI Licensed Operator Requalification Operational Simulator Scenario Number 2, Revision 17
TQ-AA-155-F05, Simulator Evaluation Form – Crew A, March 14, 2018

71111.12: Maintenance Effectiveness

Action/Condition/Issue/ Reports

04073659 04062919 04081132 04084598

Miscellaneous

TMI-73312, Failure Analysis of O-Ring, General Electric Viton, .644"x.818"x.087", F/EHC, Model U472X000BS908, dated 1/23/18

71111.13: Maintenance Risk Assessments and Emergent Work Control

Procedures

OP-TM-700-403-01, Internal Surface Inspections, Revision 1
OP-TM-108-117-1001, Three Mile Island Protected Equipment Program, Revision 4

Action/Condition/Issue/ Reports

04093302 04093679 04105768 04106329 04106371 04020311
04119646 04119869 04057820 04089656 04091172

Maintenance Orders/Work Orders

4731984 4717873 1388134 1388135 04695699
 Troubleshooting Log for the 'B' RPS reactor trip module

71111.15: Operability Determinations and Functionality AssessmentsProcedures

OP-AA-108-115, Operability Determination, Revision 20
 OP-TM-108-115, Functionality Assessment for Flood Barrier System Degradation, Revision 1

Action/Condition/Issue/ Reports

04020311 04057820 04060457 04090407 04105768 04111253

Maintenance Orders/Work Orders

04097238 04617271 04631964 04643283 04644299 04648290
 04648293 04655088 04655629 04679413 04679910 04684019
 04681695 04755352

Miscellaneous

ASME Boiler and Pressure Vessel Cod N-789, Alternative Requirements for Pad Reinforcement of Class 2 and 4 Moderate Energy Carbon Steel Piping for Raw Water Service, June 25, 2011

Exelon PowerLab Calibration report dated 1/16/2018 for MS-PT-1181/83/95

C-1101-662-5350-014, TMI-1 OTSG Outlet Pressure Error Analysis, Revision 2

TMI U-1, License Renewal Application, Facility Operating License No. DPR-50, 0000620322, TMI U-1, Evaluation of Domestic Water Piping in the Control Building to Withstand SSE, Revision 0

2705855-05, TMI U-1, Technical Evaluation-Internal Flooding Design Review, Revision 1

0370-025-831, Pressure and Temperature Conditions Following High Energy Line Breaks in the Intermediate Building, Revision 2

ECR 432196, EF-U-1 Drip Oiler Drip Rate, Revision 1

SDBD-T1-122, System Design Basis Document for Flood Protection Systems, Revision 5
 System Health Report for Nuclear Service Closed Cooling Water System

71111.18: Plant ModificationsProcedures

1301-8.2A, Diesel Generator Inspection, Revision 20

1303-4.16, Electrical Power System, Revision 143

Action/Condition/Issue/ Reports

04101842 04100776 04099863

Maintenance Orders/Work Orders

04732456

Miscellaneous

Engineering Change Number 622205, Emergency Diesel Generator Crankcase Pressure Time Delay Setting Change, Revision 0

Engineering Change Number 433669

Engineering Change Number 619256, Replacements for MSA Combustible Gas Monitors, Revision 0

71111.19: Post-Maintenance TestingProcedures

1104-19, Control Building Ventilation System, Revision 85
 1303-4.11, HPI/LPI Logic and Analog Channel Test, Revision 60
 MA-AA-716-230-1002, Vibration Analysis/Acceptance Guidelines, Revision 5
 OP-TM-424-201, IST of EP-P-2A, Revision 10

Action/Condition/Issue/ Reports

04112327

Maintenance Orders/Work Orders

04731984 04358003 04579369 04714859 04617147 04720890

71111.22: Surveillance TestingProcedures

1303-5.2A, "A" Emergency Loading Sequence and HPI Logic Channel/Component Test,
 Revision 19
 ER-AA-321, Administrative Requirements for Inservice Testing, Revision 12
 MA-AA-716-230-1002, Vibration Analysis/Acceptance Guidelines, Revision 5
 OP-TM-212-201, IST of DH-P-1A and Valves from ES Standby Mode, Revision 15
 OP-TM-214-201, BS-P-1A and Valve IST, Revision 13

Action/Condition/Issue/ Reports

04091609 04060457

Maintenance Orders/Work Orders

04695024 04697104 04706112 04713376 04709871 04698102

Miscellaneous

ECR 432196, EF-U-1 Drip Oiler Drip Rate, Revision 1
 0370-025-831, Pressure and Temperature Conditions Following High Energy Line Brakes in the
 Intermediate Building, Revision 2

71124.06: Radioactive Gaseous and Liquid Effluent TreatmentProcedures:

CY-AA-130-201, Radiochemistry Quality Control, Revision 5
 CY-TM-170-203, Unit Vent (RM-A-8 and RM-A-9) Sampling, Revision 8
 CY-TM-170-2001, Releasing Radioactive Liquid Waste, Revision 1
 CY-TM-170-2005, Dose Calculations For Liquid And Gas Effluents, Revision 0
 CY-TM-170-2007, Non-Routine Effluent Releases, Revision 2
 CY-TM-170-2011, Releasing Radioactive Gaseous Effluents Waste Gas Tanks A (B) (C),
 Revision 1
 CY-TM-170-2012, Releasing Radioactive Gaseous Effluents Reactor Building Purges-TMI-1,
 Revision 2
 CY-TM-170-2020, Radiological Abnormal Release or Discharge, Revision 3
 EN-AA-407, Response to Inadvertent Releases of Licensed Material to Groundwater, Revision 8
 EN-AA-408, Radiological Groundwater Protection Program, Revision 0
 EN-AA-408-4000, Radiological Groundwater Protection Program Implementation, Revision 8
 EN-TM-408-4160, RGPP Reference Material for Three Mile Island, Revision 3
 N1828, QA Program for Radiological Effluent Monitoring, Revision 12

Condition Reports:

02701231	02725922	02740615	03978007	04027208	04055690
04079220	04081934	04086934	04086437		

Effluent Monitor Calibrations

Efficiency Flow

RMA-4	WO 04383025	11/10/2017	WO 04377526	07/17/2017
RMA-5	WO 04375029	01/13/2017	WO 04367310	01/31/2017
RMA-6	WO 04374654	05/28/2017	WO 04351282	05/28/2017
RMA-7	WO 04368209	01/21/2017		
RMA-8 P	WO 04379177	12/01/2017		
RMA-8 Gas Hi	WO 04369660	08/06/2017		
RML-6	WO 04358349	04/02/2017		

Discharge Packages

Liquid

20170130-228-B
 20170401-293-C
 20170529-301-B
 20170811-350-B
 20171129-423-B

Gaseous

20170225-141-B
 20170502-159-B
 20170630-173-B
 20170726-184-B
 20170905-193-B
 20171005-224-B
 20171229-256B

Other Documents:

EXELON TMI Combined 2015 Annual Radioactive Effluent Release Report, April 29, 2016
 EXELON TMI Combined 2016 Annual Radioactive Effluent Release Report, April 28, 2017
 Quarterly Results of Radiochemistry Cross Check Program, 1st Quarter 2016 through 4th Quarter 2017

71151: Performance Indicator VerificationMiscellaneous

CY-AA-130-3010-F-04, TMI U-1, Dose Equivalent Iodine Determination, dated 12/13/17
 CY-AA-130-3010-F-04, TMI U-1, Dose Equivalent Iodine Determination, dated 12/20/17
 CY-AA-130-3010-F-04, TMI U-1, Dose Equivalent Iodine Determination, dated 12/13/17
 CY-AA-130-3010-F-04, TMI U-1, Dose Equivalent Iodine Determination, dated 2/14/18
 CY-AA-130-3010-F-04, TMI U-1, Dose Equivalent Iodine Determination, dated 2/21/18
 LS-AA-2100, TMI U-1, Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, for October 2017, dated 10/10/17
 LS-AA-2100, TMI U-1, Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, for November 2017, dated 11/29/17
 LS-AA-2100, TMI U-1, Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, for December 2017, dated 1/11/18

71152: Problem Identification and ResolutionProcedures

PI-AA-125, Corrective Action Program Procedure, Revision 6

PI-AA-125-1006, Investigation Techniques Manual, Revision 3

71153: Follow-up of Events and Notices of Enforcement DiscretionProcedures

1303-11.20, RB Access Hatch Interlocks, Revision 18

Action/Condition/Issue/ Reports

04085607	04085596	04081290	04085589	04049166	04049265
04042038					

Maintenance Orders/Work Orders

04608147	04608146	R2254319	R2264573	R2266475	R2271362
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Miscellaneous

EC 618854, Tornado Missile Protection Technical Evaluation Phase II, Revision 0

EC 621718, Tornado Safe Shutdown and Strategy List, Revision 0