



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

April 30, 2015

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

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – NRC INTEGRATED  
INSPECTION REPORT 5000289/2015001

Dear Mr. Hanson:

On March 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Three Mile Island, Unit 1 (TMI) facility. The enclosed inspection report documents the inspection results, which were discussed on April 17, 2015 with Mr. Rick Libra, TMI Site Vice President, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No NRC-identified or self-revealing findings were identified during this inspection. However, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy. If you contest the non-cited violation in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Three Mile Island.

In accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390 of the NRCs "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly

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Sincerely,

***/RA/***

Silas R. Kennedy, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Docket Nos.: 50-289  
License Nos.: DPR-50

Enclosure: Inspection Report 05000289/2015001  
w/Attachment: Supplementary Information

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**U.S. NUCLEAR REGULATORY COMMISSION****REGION I**

Docket No: 50-289

License No: DPR-50

Report No: 05000289/2015001

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Dates: January 1 through March 31, 2015

Inspectors: D. Werkheiser, Senior Resident Inspector, Division of Reactor Projects (DRP)  
J. Heinly, Resident Inspector, DRP  
E. Burket, Emergency Preparedness Inspector, Division of Reactor Safety (DRS)  
J. D'Antonio, Senior Operations Engineer, DRS  
J. Petch, Resident Inspector (Acting), DRP  
D. Silk, Senior Operations Engineer, DRS

Approved by: S. Kennedy, Chief  
Projects Branch 6  
Division of Reactor Projects (DRP)

Enclosure

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## **SUMMARY**

IR 05000289/2015001, 01/01/2015-03/31/2015; Three Mile Island, Unit 1, Integrated Inspection Report.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. A licensee-identified violation of very-low safety significance was documented. The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### **NRC-Identified and Self-Revealing Findings**

No findings were identified.

### **Other Findings**

A violation of very low safety significance that was identified by Exelon was reviewed by the inspectors. Corrective actions taken or planned by Exelon have been entered into Exelon's corrective action program. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of 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.

## 1. REACTOR SAFETY

### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01 – 1 sample)

##### .1 Readiness for Impending Adverse Weather Conditions

###### a. Inspection Scope

The inspectors reviewed Exelon's preparations for the onset of extreme cold weather during the periods of February 14 – 16 and February 19 – 20, 2015. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of and during this adverse weather condition. The inspectors walked down the emergency diesel generators and safety-related water systems to ensure system availability. The inspectors verified that operator actions defined in Exelon's adverse weather procedure for TMI maintained the readiness of essential systems. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel. Documents reviewed for each section of this inspection report are listed in the Attachment.

###### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment

##### .1 Partial System Walkdowns (71111.04Q – 4 samples)

###### a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'A' makeup pump and 'A' makeup train (high pressure injection) during performance of planned 'B' low pressure injection maintenance on January 6, 2015
- 'B' intermediate closed cooling system during performance of the 'A' intermediate closed cooling system planned outage on February 3, 2015
- 'B' makeup pump and seal injection alignment during planned 'C' makeup pump maintenance on February 24, 2015
- Emergency feedpump 1 and 2B alignment during planned 2A emergency feedpump maintenance on March 4, 2015

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the Updated Final Safety Analysis

Report (UFSAR), technical specifications, work orders, issue reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the corrective action program for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Engineered safety feature ventilation building; elevation 331' (AB-FZ-11) on January 15, 2015
- Auxiliary building decay heat vault (B) elevation 261' (AB-FA-2) on January 21, 2015
- Turbine building hydrogen seal oil unit area (TB-FA-1(6)), on February 27, 2015
- Turbine building main turbine oil conditioner area (TB-FA-1(8)), on February 27, 2015
- Spent fuel pool area; elevation 348' (FH-FZ-4) on March 18, 2015

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the corrective action program to determine if Exelon identified and corrected flooding



problems and whether operator actions for coping with flooding were adequate. The inspectors also focused on the 'B' decay heat vault area to verify the adequacy of equipment seals located below the flood line, floor, and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the 'A' intermediate closed cooling heat exchanger to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified Exelon's commitments to NRC Generic Letter 89-13 were being maintained. The inspectors observed actual performance tests for the heat exchangers and/or reviewed the results of previous inspections of the heat exchanger reviewed. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that Exelon initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11 – 3 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training (71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed licensed operator simulator training on March 17, 2015. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room  
(71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed crew 'D' control room operations on January 12, 2015. Main activities included 'B' emergency diesel generator quarterly testing and reactor protection system channel 'D' logic testing. The inspectors observed licensed operators performance to verify that procedure use, crew communications, and coordination of activities between work groups met the criteria specified in Exelon's OP-AA-1, "Conduct of Operations," Revision 0. In addition, the inspectors verified that Exelon supervision and management were adequately engaged in plant operations oversight and appropriately assessed control room operator performance and similarly met established expectations and standards.

b. Findings

No findings were identified.

.3 Biennial Review of Licensed Operator Requalification Program (71111.11B – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program."

Examination Results

The operating tests for weeks four and five of the 2015 requalification exam were reviewed for quality. Complete exam results for all weeks were reviewed for operator performance.

On April 6, 2015, the results of the biennial written examination and annual operating tests were reviewed to determine if pass/fail rates were consistent with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process." The review verified that the failure rate (individual or crew) did not exceed 20%.

- 2 out of 42 operators failed at least one section of the examination. The overall individual failure rate was 4.8%
- 0 out of 7 crews failed the simulator test. The crew failure rate was 0.0%

Observations were made of the dynamic simulator exams and job performance measures (JPM) administered during the week of March 16, 2015. These observations included facility evaluations of crew and individual performance for two crews during the dynamic simulator exams and individual performance of five JPMs.

### Written Examination Quality

The inspectors reviewed two written examinations administered during the 2015 examination cycle for qualitative and quantitative attributes as specified in Appendix B of Attachment 71111.11, Licensed Operator Requalification.

### Operating Test Quality

Fourteen JPMs and seven scenarios were reviewed for qualitative and quantitative attributes as specified in Appendix C of 71111.11, "Licensed Operator Requalification Program."

### Licensee Administration of Operating Tests

Observations were made of the dynamic simulator exams and JPMs administered during the week of March 16, 2015. These observations included facility evaluations of crew and individual performance for two crews during the dynamic simulator exams and individual performance of five JPMs.

### Examination Security

The inspectors assessed whether facility staff properly safeguarded exam material. JPMs, scenarios, and written examinations were checked for excessive overlap of test items.

### Remedial Training and Re-Examinations

The remediation plans for two individual dynamic simulator failures, one JPM examination failure and one written failure were reviewed to assess the effectiveness of the remedial training. Remediation for the individuals was processed in accordance with site procedures.

### Conformance with Operator License Conditions

Medical records for seven licensed operators were reviewed to assess conformance with license conditions. All records reviewed were satisfactory.

Proficiency watch standing records for 2014 were reviewed. All active licensed operators met the watch standing requirements to maintain an active license.

The reactivation plans for five operator licenses were reviewed to assess the effectiveness of the reactivation process. The reactivation was successfully processed in accordance with site procedures.

Records for the participation of licensed operators in the requalification program for two years were reviewed. Records for the performance of licensed operators on annual requalification operating test and biennial requalification written exams were reviewed for two requalification examination cycles.

### Simulator Performance

Simulator performance and fidelity was reviewed for conformance to the reference plant control room. A sample of simulator deficiency reports was also reviewed to ensure facility staff addressed identified modeling problems. Simulator test documentation was also reviewed.

### Problem Identification and Resolution

A review was conducted of recent operating history documentation found in inspection reports, the licensee's corrective action program, and the most recent NRC plant issues matrix. The inspectors also reviewed specific events from the licensee's corrective action program which indicated possible training deficiencies, to verify that they had been appropriately addressed. The senior resident inspector was also consulted for insights regarding licensed operators' performance. These reviews did not detect any operational events that were indicative of possible training deficiencies.

#### b. Findings

No findings were identified.

### 1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

#### a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, or component (SSC) performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure that Exelon was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Safety-related motor-operated valve operator failures documented in issue reports (IRs) 2439088 and 2446393 on February 10, 2015
- Spent fuel valve (SF-V-12) operator mechanical issues on March 31, 2015

#### b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Planned maintenance on the 'B' decay heat (low pressure injection) system on January 6, 2015
- Planned yellow station risk during building spray 'B' train system maintenance outage window, January 13, 2015
- Planned yellow station risk during the turbine driven emergency feedwater pump outage on January 29, 2015
- Extended planned maintenance outage on the 'A' intermediate closed cooler on February 3, 2015
- Unplanned loss of decay heat removal system redundancy due to excessive decay heat removal system reactor coolant suction valve (DH-V-3) stroke time on February 4, 2015

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions:

- 10 CFR 21 (EN 49667) regarding 'C' & 'D' battery positive plate separator defects as documented in IR 2425850 on January 7, 2015
- Out of tolerance data point for the reactor coolant loop 'A' T-Hot element (RC4A-TE-4) as documented in IR 2440307 during extent of condition investigation for RC4A-TE-1 on January 21, 2015
- Oil Leak on 'A' building spray pump (BS-P-1A) as documented in IR 2442718 on January 26, 2015
- Detector damage to reactor building effluent instrument (RM-A-9) as documented in IR 2442773 on January 27, 2015

- Packing failure on an important to safety condensate valve (CO-V-26B) as documented in IR 2453772, on February 18, 2015
- Low electrolyte temperature for 'A' and 'B' safety-related station batteries (EED-B-1A/B) as documented in IRs 2455485 / 2455885 on February 20, 2015

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

Permanent Modifications

a. Inspection Scope

The inspectors evaluated a modification to the 'B' emergency diesel generator governor synchronizing motor as implemented by work order C2034113. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the vendor control documents of the synchronizing motor regarding cable routing and installation mounts

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure was consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- 'B' decay heat (low pressure injection) system outage on January 7, 2015
- Liquid radiation monitor (RM-L-1) relay replacement on January 18, 2015
- Engineered safety actuation system Eaton Cutler-Hammer relay replacement affecting a safety-related reactor river valve (RR-V-4C) on January 26, 2015
- 'A' building spray oil seal replacement on February 24, 2015
- Emergency feed pump (EF-P-2A) planned maintenance on March 5, 2015
- Instrument air compressor (IA-C-1B) planned overhaul on March 12, 2015

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- OP-TM-826-245, control building chilled-water check valve (CH-V-24) in-service test on January 1, 2015 (in-service test)
- 1303-11.39A, heat sink protection system (emergency feedwater) automatic initiation test, on January 9, 2015
- 1107-9, quarterly station blackout diesel generator test, on January 23, 2015
- 1302-3.1A9, calibration of effluent gas channel (RM-A-9G) on January 28, 2015
- 1301-5.6, core flooding tank water sample and boron analysis, on March 4, 2015

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)

a. Inspection Scope

Exelon implemented various changes to the Three Mile Island Emergency Action Levels (EALs), Emergency Plan, and implementing procedures. Exelon had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan, and that the revised Plan continued to meet the standards in 10 CFR 50.47(b) and the requirements of 10 CFR 50 Appendix E.

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by Exelon as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 1 sample)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine Exelon emergency drill on February 19, 2015 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator and technical support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by Exelon staff in order to evaluate Exelon's critique and to verify whether the Exelon staff was properly identifying weaknesses and entering them into the corrective action program.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151 – 3 samples)

Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications

a. Inspection Scope

The inspectors reviewed Exelon's submittals for the following Initiating Events cornerstone performance indicators for the period of January 1, 2014 through December 31, 2014.

- Unplanned Scrams
- Unplanned Power Changes
- Unplanned Scrams with Complications



To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors reviewed Exelon's operator narrative logs, maintenance planning schedules, condition reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Exelon entered issues into the corrective action program at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the corrective action program and periodically attended issue report screening meetings.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 2 samples)

.1 Plant Events

a. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the events to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance.

- Non-emergency event notification (EN# 50932) regarding past seismic monitor unavailability for emergency plan assessment on March 27, 2015

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report (LER) 05000289/2014-001-00: Unfused DC Motor Control Circuits

On April 25, 2014, during a review of industry operating experience, Exelon identified postulated fire-induced circuit failures involving unfused DC motor control circuits for TMI. The postulated fire-induced circuit failures could cause a secondary fire that could adversely affect fire safe shutdown equipment contrary to License Condition 2.C(4), which requires in part, post-fire safe shutdown cables remain free of the effects of fire-induced cable faults during postulated fires. Specifically, the licensee identified 250VDC full-voltage control circuits for four non-safety emergency bearing oil pumps routed in the same cable tray with fire-safe shutdown control circuits that were not provided with overcurrent protection. Postulated fires in the cable spreading room could cause failure of the unprotected 250VDC circuits, which in turn could cause failure of the control circuits for both instrument air compressors. The instrument air compressors (IA-P-1A/B) are credited in the fire safe shutdown path for a fire in the cable spreading room. Exelon determined the cause of the condition to be an original design and construction oversight involving the failure to include protective fuses in the DC motor control circuits. There were no actual safety consequences of this condition.

The licensee submitted LER 05000289/2014-001-00 to report this event in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety. The licensee entered this issue into their corrective action program as IRs 1651702, 1658837, 1658842 and implemented compensatory measures in the affected fire areas pending final resolution of the issue. The licensee completed an engineering evaluation (1651702-02, 03) of the issue and developed a design change (ECR 14-00255, 14-00279) to add overcurrent protection (fuses) to the affected motor control circuits. Exelon completed the necessary modifications for all affected motor control circuits by May 30, 2014.

The significance and enforcement aspect of this issue are discussed in Section 4OA7 of this inspection report. LER 05000289/2014-001-00 is closed.

4OA6 Meetings, Including ExitBiennial Review of Licensed Operator Requalification Program (Section 1R11)

On March 19, 2015, the inspectors presented the inspection results to Mr. Clint Six, TMI Director of Site Operations, and other members of Exelon management at the conclusion of the inspection. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

### Quarterly Inspection Report Exit

On April 17, 2015, the inspectors presented the inspection results to Mr. Rick Libra, TMI Site Vice President, and other members of the TMI staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

#### 4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by Exelon and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

#### Unfused DC Motor Control Circuits

LER 05000289/2014-001-00 describes an unanalyzed condition in which Exelon identified DC motor control circuits were unfused. Specifically, Exelon did not provide overcurrent protection for wiring associated with 250VDC full-voltage control circuits for four non-safety emergency bearing oil pumps in the turbine building to prevent wires from overheating due to fire-induced faults and excessive currents flowing through the cable. With enough current flowing through the cable, the potential exists that the overloaded motor control wiring could damage adjacent control circuit wiring for both instrument air compressors (IA-P-1A/B), which are needed to achieve and maintain post-fire safe shutdown for a fire in the cable spreading room. This condition could result in a loss of the associated safe shutdown components or a secondary fire in another fire area. The failure to protect safe shutdown cables from the effect of postulated fires was a performance deficiency.

This performance deficiency was a violation of TMI Operating License Condition 2.C.(4), which requires, in part, post-fire safe shutdown cables remain free of the effects of fire-induced cable faults during postulated fires. Contrary to the above, Exelon identified they failed to meet this requirement and the condition existed since initial construction. The issue was more than minor because it was associated with the protection against external events (fire) attribute of the mitigating systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined that the finding was of very low safety significance (Green), based on IMC 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 2 screening criteria.

The finding screened to Green based upon task number 2.3.5, and because no credible fire ignition source was determined to adversely affect the motor control circuits of concern as determined. Additionally, a fire area of concern (cable spreading area) is an alternate shutdown fire area protected by detection and an automatic suppression system. The cables in the other fire area of concern (turbine building) are Institute of Electrical and Electronics Engineers 383 (thermoset) construction with steel armor and tied to station ground which decreases the likelihood of inter-cable and intra-cable interactions. Because this finding is of very low safety significance and had been entered into Exelon's corrective action program (IRs 1651702, 1658837, 1658842), this violation is being treated as a Green, licensee-identified NCV consistent with the NRC's Enforcement Policy.

### **ATTACHMENT: SUPPLEMENTARY INFORMATION**

Enclosure

**SUPPLEMENTARY INFORMATION****KEY POINTS OF CONTACT**Licensee Personnel

M. Adams	Operations Shift Supervisor
T. Alvey	Manager, Chemistry
D. Atherholt	Manager, Regulatory Assurance
R. Campbell	Manager, Site Security
D. DeAngelis	EDG System Engineer
D. Divittore	Manager, Radiological Engineering
M. Fitzwater	Senior Regulatory Assurance Engineer
T. Haaf	Plant Manager
R. Harris	Control Room Supervisor
M. Harty	Control Room Supervisor
G. Herneissey	Lead LORT Training
D. Lewis	Shift Manager
R. Libra	Site Vice President
B. Masoero	In-Service Testing Engineer
B. McSorley	Senior Design Engineer
R. Miller	TMI Regulatory Assurance Engineer
S. Nowak	Instrumentation Engineer
J. Piazza	Senior Manager, Design Engineering
W. Price	Operations, Shift Manager
D. Schmeichel	RN, Health Care Professional Site Nurse
C. Six	Director, Site Operations
C. Smith	Shift Manager
G. Smith	Director, Maintenance
B. Shumaker	Manager, Emergency Preparedness
S. Taylor	Engineer
J. Tesmer	Simulator Coordinator

Other Personnel

D. Dyckman	Nuclear Safety Specialist Pennsylvania Department of Environmental Protection Bureau of Radiation Protection
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**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**Closed

05000289/2014-001-00	LER	Unfused DC Motor Control Circuits (Section 4OA3.2)
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## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

#### Procedures

1104-46, Electric Heat Tracing, Rev. 60  
 1107-3, Diesel Generator, Rev. 142  
 E-70, Heat Trace Inspection, Rev. 14

#### Drawings

302-640, Decay Heat Removal Flow Diagram, Rev. 84  
 B-308-810, Intermediate Cooling Surge Tank & Borated Water Storage Tank Level Transmitters, Rev. 10  
 B-308-897, BWST/Sodium Hydroxide Tank, Rev. 6

#### Miscellaneous

DH-LT-808/809 Heat Trace Temperature Monitoring Logs, dated February 19 – 22, 2015  
 Equipment Issue Investigation 2452858, BWST Level Indication DH-LI-808A OOS  
 Equipment Issue Investigation 2456417/2457114, EDG 'A' Fan Drive Gear Box Cold to Touch, February 20, 2015  
 MA-AA-716-004, Troubleshoot Log for Heat Trace for DH-V-1004/1005 and DH-LT-808/809, dated February 20, 2015  
 Safety-Related Heat Trace Extent of Condition List, dated February 19, 2015  
 TMI OCC Shift Logs dated February 15 – 19, 2015  
 TMI Operations Shift Logs dated February 15 – 17, 2015  
 TMI Operations Shift Priority Work List, February 17, 2015  
 TMI PAO NewsFlash, "Cold Weather Alert for This Weekend," February 12, 2015

ARs:	2373871	2373820	2033926			
PMs:	220931					
IRs:	2452858	2457834	2451342	2457763	2456909	2456877
	2456162	2455849	2456417	2457114	2457214	2451342
	2453266	2453273	2453540	2453528	2453521	2452171
	2452830	2453022	2454184	2454784	2454817	2454803
	2455207	2454937	2454932	2454925	2454883	

### **Section 1R04: Equipment Alignment**

#### Procedures

OP-TM-211-000, Makeup and Purification System, Rev. 29  
 OP-TM-211-432, Removing MU-P-1C from Service, Rev. 5  
 OP-TM-211-449, Aligning MU-P-1B to 1D 4160V Bus, Rev. 3  
 OP-TM-424-000, Emergency Feedwater System, Rev. 12  
 OP-TM-424-271, Standby Lineup and Flow Path Verification Check of EFW System, Rev. 9  
 OP-TM-424-901, Emergency Feedwater, Rev. 2  
 OP-TM-424-902, EFW Alternate Inventory, Rev. 6  
 OP-TM-541-000, Primary Component Cooling, Rev. 21  
 OP-TM-541-449, Remove IC-C-1A From Service, Rev. 2

Drawings

302-082, Emergency Feedwater, Rev. 24  
302-101, Condensate, Rev. 66  
302-620, Intermediate Cooling Flow Diagram, Rev. 51  
302-660, Make-up & Purification, Rev. 45  
302-661, Make-up & Purification, Rev. 61  
302-662, MU Pump Auxiliary Systems, Rev 0

Miscellaneous

IST Program Check Valve Condition Monitoring Plan, Group CMP-IC-01, 1/30/2015  
IST Program Check Valve Condition Monitoring Plan, Group CMP-IC-02, 1/30/2015  
ARs: A2365945 A2181740 A2181744  
IR: 2433175

**Section 1R05: Fire Protection**

Procedures

TMI-1 Fire Hazards Analysis, Rev. 26  
1035, Control of Transient Combustible Materials, Rev. 28  
1038, Administrative Controls-Fire Protection Program, Rev. 76  
CC-AA-309-101, Engineering Technical Evaluations, Rev. 11  
OP-AA-201-009, Control of Transit Combustible Material, Rev. 13  
OP-MA-201-007, Fire Protection System Impairment Control, Rev. 6

Miscellaneous

AB-FZ-11 Pre-Fire Plan, ESF Ventilation BLDG; Elevation 331', Rev. 26  
FH-FZ-4 Fuel Pool Area Pre-Fire Plan, Rev. 3  
TB-FA-1(6) Hydrogen Seal Oil Unit Pre-Fire Plan, Rev. 26  
TB-FA-1(7) Main Turbine Oil Conditioner Pre-Fire Plan, Rev. 26  
TCP 2015-20  
TCP 2015-21

**Section 1R06: Flood Protection Measures**

Miscellaneous

IR: 1633652

**Section 1R07: Heat Sink Performance**

Miscellaneous

IC-C-1A Eddy Current Examination Report, February 8, 2013  
IC-C-1A Eddy Current Examination Report, February 5, 2015  
IRs: 2446992 2447101 2446952 2448199 2448639  
WO: R2217135

## **Section 1R11: Licensed Operator Regualification Program**

### Procedures

1303-4.16, Emergency Power System, Rev. 135  
1303-4.2D, RPS Channel D CRD Breaker and Test Module Testing, Rev. 16  
NRC Licensed Operator Medical Examination, HR-AA-07-101  
OP-AA-105-102, NRC Active License Maintenance  
TQ-AA-150, Operator Training Programs, Revision 10  
TQ-AA-224, Exelon Nuclear Training- Implementation Phase Revision 8  
TQ-AA-155, Conduct of Simulator Training and Evaluation Revision 3  
TQ-AA-224-F100, Remedial Training Notification and Action on Failure Revision 6  
TQ-JA-150-20, Revision 7  
TQ-AA-201, Examination Security and Administration Revision 16  
TQ-TM-201-1001, Simulator Exam Security Checklist Revision 17

### Miscellaneous

2015 Annual Operating Exams Weeks 4, 5  
2015 Biennial Written Exams Weeks 4, 5  
TMI Pre NRC 71111.11 Inspection Self-Assessment

### Simulator Work Requests

14602 14964 15243 15299 15404 15877

### Simulator-Related Test Documents

TMI Simulator Test Plan, TQ-TM-306-0102  
Simulator Review Board Agenda/Minutes for 2/10/15  
Simulator Testing Report Update (4/29/12 – 4/29/14)  
TMI Simulator vs Station Hardware Comparison Checks, 2014  
Transient Performance Test OES 33, Post-Event Review: Start RCP “B” from 28% Power  
Transient Performance Test OES 34, Planned Shutdown to 50% Power for Cooling Tower Maintenance  
Three Mile Island Simulator Accuracy Test, 2014  
TMI Transient Performance Tests OT1 through OT11, 2014

## **Section 1R12: Maintenance Effectiveness**

### Procedures

ER-AA-310, Implementation of the Maintenance Rule, Rev. 9  
ER-AA-310-1005, Maintenance Rule – Dispositioning between (a)(1) and (a)(2), Rev. 7  
ER-TM-310-1001, TMI Guidance for Maintenance Rule Unavailability Monitoring, Rev. 5

### Drawings

302-630, Spent Fuel Cooling System, Rev. 32

### Miscellaneous

CTP-IST-013, Exercise Testing Requirements for Valves with Fail-Safe Actuators, Rev. 0  
ARs: A2321942 A2314842 A2319424  
IRs: 1524554 1644663 2401352  
WO: R2242010

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**Procedures

1082.1, TMI Risk Management Program, Rev. 8  
 OP-AA-108-117, Protected Equipment Program, Rev. 4  
 OP-AA-201-012-1001, Operations On-Line Fire Risk Management, Rev. 1  
 OP-TM-211-000, Makeup and Purification System, Rev. 29  
 OP-TM-212-000, Decay Heat Removal System, Rev. 19  
 OP-TM-212-911, Post LOCA Reactor Vessel Boron Concentration Control, Rev. 2  
 WC-AA-101, On-Line Work Control Process, Rev. 18  
 WC-AA-101-1006, On-Line Risk Management and Assessment, Rev. 1

Drawings

302-640, Decay Heat Removal Flow Diagram, Rev. 84

Miscellaneous

Operations Equipment Checklists and Verifications, January 13, 2015  
 Protected Equipment List, DH-V-3 Inoperable (B train PI), February, 3, 2015  
 TM-CRM-042, Development of Equipment Scoping for the Inclusion of Fire Insights into TMI Configuration Risk Management Program, Rev. 0  
 TM-CRM-043, Development of risk Management Actions for the Inclusion of Fire insights into Three Mile Island Nuclear Generating Station Configuration Risk Management Program, Rev. 2

IRs:	2433175	2433398	2447087	2447080	2446921	2442718
	2446955	2451607	2470304	2470269*		

\*IR generated based on inspection

**Section 1R15: Operability Evaluations**Procedures

1301-4.6.1, Station Battery 1A Weekly, Rev. 011  
 1302-3.1A.9, Calibration of Victoreen Eluent Gas Channel RM-A-9G, Rev 000  
 CY-TM-170-300, Offsite Dose Calculation Manual, Rev. 3  
 ODCM 2.1, Table 2.1-2, Action 27 and 31, Rev.3  
 OP-AA-108-115, Operability Determinations, Rev. 10  
 OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability Determinations, Rev. 2  
 OP-TM-212-000, Decay Heat Removal System, Rev. 019  
 OP-TM-214-000, Building Spray System, Rev. 011  
 TS 3.3.1.3, Reactor Building Spray System, Amendment 278  
 TS 3.5, Table 3.5-1.C.3.f, Table 3.5-3, 1.d, Amendment 240

Calculations

C-1101-421-E610-013, Minimum Required Condensate Inventory, Rev. 1  
 C-1101-734-5350-003, TMI battery Sizing, Rev. 12A

Drawings

1D-ISI-FD-008, Condensate System, Rev. 8  
 302-101, Condensate Flow Diagram, Rev. 66



Miscellaneous

Event Notification #49667, dated September 16, 2014

IEEE 485-1983, Lead Acid batteries for Stationary Application

VM-TM-0837, Cast Steel Bolted Cover Swing Check Valves, Rev. 7

IRs:	2442718	2442773	2442722	2455234	2398201	2455949
	2455885	2457074	2454355	2455485	2464368	2464371
WOs:	A2370679	R2234477	A2336279	A2372041	R2192216	R2253036

**Section 1R18: Plant Modifications**Procedures

1107-3, Diesel Generator, Rev. 142A

1303-4.16, Emergency Power System, Rev. 135A

CC-AA-102, Design Input and Configuration Change Impact Screening, Rev. 20

CC-AA-103, Configuration Change Control, Rev. 21

Calculation

C-11-1-862-5360-002, EDG Loading and Fuel, Rev. 9

Miscellaneous

UG8 Woodward Governor and Auxiliaries Technical Manual

AR: A2375526

IRs: 2468849 2467394

**Section 1R19: Post-Maintenance Testing**Procedures

1104-25, Instrument and Control Air System, Rev. 151

1303-5.2AY, Surveillance Procedure, Rev. 0A

MA-AA-716-012, Post Maintenance Testing, Rev. 20

OP-TM-212-000, Decay Heat Removal System, Rev. 019

OP-TM-212-202, IST of DH-P-1B and Valves ES Standby Mode, Rev. 13

OP-TM-212-252, Recirculation and Sampling of BWST, Rev. 8

OP-TM-214-201, IST of BS-P-1A and Valves, Rev. 13

OP-TM-534-000, Reactor Emergency Cooling Water System, Rev. 1

Drawings

302-082, Emergency Feedwater, Rev. 24

302-221, Secondary Services Cooling System Closed Cycle, Rev. 54

302-231, Fire Service Flow Diagram, Sheet 2, Rev. 17

Miscellaneous

IRs:	2426161	2437839	2426898	2463495	2468089	2468776
	2442718	2406435	133055	2459164	2459195	2455949
WOs:	R2046165	R2178949	R2218822	C2033486	R2218832	R2140099
	R2250914	C2033341	R2178477	R2206746	R2214095	

**Section 1R22: Surveillance Testing**Procedures

1107-9, Station blackout Diesel Generator, Rev. 075 & 075A  
 1301-5.6, Core Flooding Tank Water Sample, Rev. 13  
 1303-11.39A, HSPS-EFW Auto Initiation TS LCO 3.3, Rev. 44  
 ER-AA-321-1007  
 OP-TM-826-245, IST of CH-V-24, Rev. 0  
 WC-TM-430, Surveillance Testing Program, Rev. 0  
 WC-TM-430-1001, Surveillance Testing Program Database Interface and Maintenance, Rev. 1

Miscellaneous

TMI Plan of the Day, Priority Worksheet, dated January 26, 2015  
 TMI Shift Operations Log, dated January 23-25, 2015  
 Cycle 13 Boron Constraints, Rev. 1

IRs:	2431365	2431633	2442773	2442722	2442022
	2441867	2441846	2441675	2441547	2441519
	2441438				
WOs:	R2234477	A2336279	A2372041		

**Section 1EP4: Emergency Action Level and Emergency Plan Changes**Procedures

EP-AA-111, Emergency Classification and Protective Action Recommendations, Rev. 19

Miscellaneous

EP-AA-1000, Exelon Nuclear Standardized Radiological Emergency Plan, Rev. 26  
 EP-AA-1009, Three Mile Island (TMI) Station Radiological Emergency Plan Annex, Rev. 23

**Section 1EP6: Drill Evaluation**Miscellaneous

Three Mile Island 2015 Pre-Exercise Evaluation Report, March 19, 2015  
 IRs: 2456443 2456378 2456352 2456337 2456332 2456314

**Section 4OA1: Performance Indicator Verification**Procedures

LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Rev. 014  
 SY-TM-1019, Collection of NRC Performance Indicator Information, Rev. 009

Miscellaneous

Consolidated Data Base (TMI), dated February 9, 2015

**Section 4OA3: Followup of Events and Notices of Enforcement Discretion**Procedures

OP-AA-300, Reactivity Management, Rev. 007  
 NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, Rev. 3

Drawings

TMI-1 R\*TIME Plot for Reactor Power, dated February 25, 2015

Miscellaneous

ECR 14-00255, Install Control Circuit Fuse for LO-P-6 for Appendix R Protection, Rev. 0  
ENS 49875, 50059

NRC Information Notice 2014-10, Potential Circuit Failure-Induced Secondary Fires or  
Equipment Damage

TMI-1 LER 2014-001-00, Unfused DC Motor Control Circuits

TMI-1 EAL HU4

IRs:	1651702	1658837	1658842	1638221	2442967	2459963
	2475492					

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
DRP	Division of Reactor Projects
EAL	Emergency Action Level
IMC	Inspection Manual Chapter
IR	Issue Report
JPM	Job Performance Measure
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
SSC	Structure, System, or Component
TMI	Three Mile Island Unit 1
UFSAR	Updated Final Safety Analysis Report