



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

May 10, 2017

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

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – INTEGRATED INSPECTION  
REPORT 5000289/2017001

Dear Mr. Hanson:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Three Mile Island, Unit 1 (TMI). On April 21, 2017 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.

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* (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

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

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

Enclosure:  
Inspection Report 05000289/2017001  
w/Attachment: Supplementary Information

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REPORT 05000289/2017001 DATED MAY 10, 2017

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket No: 50-289

License No: DPR-50

Report No: 05000289/2017001

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Dates: January 1 through March 31, 2017

Inspectors: D. Werkheiser, Senior Resident Inspector  
B. Lin, Resident Inspector  
J. Brand, Reactor Engineer  
M. Henrion, Project Engineer  
C. Hobbs, Reactor Engineer  
D. Kern, Senior Reactor Inspector  
K. Mangan, Senior Reactor Inspector  
P. Presby, Senior Reactor Inspector  
R. Rolph, Health Physicist

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

Enclosure

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**SUMMARY**

IR 05000289/2017001, 01/01/2017-03/31/2017; 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. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

No findings were identified.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On March 4, 2017, operators reduced unit power to 89 percent for planned control rod and main turbine valve testing. After testing operators returned the unit to 100 percent power on March 5. The unit 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)

##### Readiness for Impending Adverse Weather Conditions

##### a. Inspection Scope

The inspectors reviewed Exelon's preparations for the onset of severe winter weather and snowstorm 'Stella' on March 13 - 15, 2017. 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 service water systems to ensure system availability. The inspectors verified that operator actions defined in Exelon's adverse weather procedure for Three Mile Island, Unit 1 (TMI) maintained the readiness of essential systems. The inspectors discussed site readiness and staff availability for adverse weather response with operations, security, engineering, 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

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

##### a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Control building chilled-water system during emergent maintenance on February 3, 2017;
- Protected system line-up of train 'B' intermediate closed cooling system on February 6, 2017;
- B' control building chiller and ventilation system during emergent troubleshooting and maintenance on 'A' control building chiller (AH-E-4A) on February 17, 2017;
- 'A' low pressure injection system during planned 'B' low pressure injection system outage window (March 15 and 16) and decay closed coolant inlet valve (DC-V-2B) and actuator replacement on March 16, 2017

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

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.

- Turbine Building, Elevation 305' (TB-FA-1(4)) on January 26, 2017
- Air Intake Tunnel, Elevation 281' (AIT-FZ-1/1A) on January 12, 2017
- Turbine Building, Elevation 305' (TB-FA-1 (1)) on January, 26, 2017
- Auxiliary Building, Elevation 281' (AB-FZ-3) on February 8, 2017
- Control building relay room, Elevation 338'-6" (CB-FA-3D) on March 9, 2017

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed plant protection from internal flooding and focused on the air intake tunnel areas after a spurious activation of the deluge system on January 10, due to moisture accumulating in an ultraviolet detector (issue report 3961531).

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 inspector verified 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.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance  
(71111.11 – 4 total samples)

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

a. Inspection Scope

The inspectors observed control room operations in support of a planned replacement of decay heat cooler inlet valve (DC-V-2B) as well as routine plant operations conducted on March 21, 2017. 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 1. 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.

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

a. Inspection Scope

The inspectors observed licensed operator simulator training on January 10, 2017, which included simulated damage to safety-related components caused by high winds coincident with a loss of offsite power and subsequent loss of all alternating current power. 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.



Also, the inspectors reviewed operators' performance training cycle for the first quarter of 2017, which included a review of Exelon's response, evaluation and mitigating actions for a Senior Reactor Operator (SRO) failure of an NRC biennial written examination, and a review of a second SRO that missed the written examination due to a known excused absence. The inspectors interviewed operations training personnel, and reviewed the specific Performance Review Committee Data Sheet (TQ-AA-224-F090) and Remedial Training Notification and Action on Failure (TQ-AA-224-F100) which were performed by Exelon training personnel per Exelon Nuclear Training-Implementation Phase procedure TQ-AA-224. The inspectors verified the trainee knowledge deficiencies were properly documented with sufficient detail, were properly understood, and adequate remediation recommendations and actions were implemented. In addition the inspectors verified both individuals passed their respective remediation examination.

b. Findings

No findings were identified.

.3 Annual and Biennial Review of Licensed Operator Requalification and Examination Test Results (71111.11A – 1 sample; 71111.11B – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program."

Examination Results, (71111.11A)

On March 24, 2017, the results of the annual operating tests and biennial written examination were reviewed in-office to determine if pass/fail rates were consistent with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, and Inspection Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The review verified that the failure rate (individual or crew) did not exceed 20 percent.

- The overall individual operator failure rate was 2.2 percent
- The overall crew failure rate was 0 percent

Written Examination Quality

The inspectors reviewed a sample of biennial written examinations administered during the 2017 examination cycle for qualitative and quantitative attributes as specified in Appendix B of Attachment 71111.11B, "Licensed Operator Requalification."

Operating Test Quality

The inspectors reviewed the operating tests scenarios and job performance measures (JPMs) associated with the on-site examination week and the previous week. The examination materials were reviewed for qualitative and quantitative attributes as specified in Appendix C of 71111.11B, "Licensed Operator Requalification Program."

### Licensee Administration of Operating Tests

The dynamic simulator exams and JPMs administered during the week of March 13, 2017, were observed. These observations included facility evaluations of crew and individual operator performance during the dynamic simulator examinations and individual performance of JPMs.

### Examination Security

The inspectors assessed the facility staff's handling of examination material. The inspectors also checked JPMs, scenarios, and written examinations for excessive overlap of test items from week to week.

### Conformance with Operator License Conditions

License reactivation and license proficiency records were reviewed to ensure that Title 10 of the *Code of Federal Regulations* (CFR) 55.53 license conditions and applicable program requirements were met. The inspectors also reviewed a sample of records for requalification training attendance, and a sample of medical examinations for compliance with license conditions and NRC regulations.

### Simulator Performance

Simulator performance and fidelity was reviewed for conformance to the reference plant. A sample of simulator deficiency reports was 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, Exelon's corrective action program, and the most recent NRC plant issues matrix. The inspectors reviewed specific events from the Exelon's corrective action program which indicated possible training deficiencies, to verify that they had been appropriately addressed. The NRC resident inspectors were consulted for insights regarding licensed operators' performance.

#### b. Findings

No findings were identified.

#### 1R12 Maintenance Effectiveness (71111.12Q – 1 sample)

##### a. Inspection Scope

On March 16, 2017, the inspectors reviewed 'A' reactor building sump level transmitter (DH-LT-810) as-found out-of-tolerance trend review documented in issue report 3985712 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 the 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.

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.

- Elevated station risk during 'A' emergency diesel generator surveillance concurrent with 'A' intermediate closed cooling system heat exchanger system outage window on February 6, 2017;
- Unplanned protected equipment change during emergent troubleshooting and maintenance on the 'A' control building chiller (AH-E-4A) on February 17, 2017;
- Planned maintenance on the 'B' intermediate closed cooling system heat exchanger on February 21, 2017;
- Elevated station risk for planned 'C' makeup pump (MU-P-1C) system outage window on February 28, 2017;
- Planned maintenance on 'A' motor-driven emergency feedwater pump (EF-P-2A) on March 7, 2017

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Station blackout diesel battery cell resistance degradation as described in issue report 03967368, on January 27, 2017;
- 'C' nuclear river water pump (NR-P-1C) high differential pressure during post maintenance testing documented in issue report 2722807 on January 30, 2017;
- Technical support center ventilation degradation as described in issue report 3978314 on February 25, 2017;
- Excessive seat leakage for nuclear river water valve (NR-V-4A) to the circulating water tower documented in issue report 3979691 on March 13, 2017;
- 'C' make-up pump (MU-P-1C) degraded flow output performance documented in operability evaluation OPE-15-002, Revision 1, issue report 2581823 on March 16, 2017

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. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, such as in the case of operator workarounds, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)Permanent Modificationsa. Inspection Scope

The inspectors evaluated a modification to the 'A' train of the makeup system suction piping. Specifically, implementation of engineering change package 2016-00297, "Venting Improvement to MU-P-1A Suction Line," which will install an additional high-point vent. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification.

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 adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Pressurizer makeup isolation valve (MU-V-18) planned maintenance on January 19, 2017;
- 'C' nuclear river water pump (NR-P-1C) repairs on February 6, 2017;
- 'A' intermediate closed cooling water heat exchanger planned maintenance, cleaning, and tube inspection on February 10, 2017;
- 'C' makeup pump (MU-P-1C) post maintenance tests on March 1, 2017;
- 'A' motor-driven emergency feedwater pump (EF-P-2A) following system outage for an oil change and replacement of time delay relay (62EFA) on March 7, 2017;
- 'B' decay closed cooling system following decay closed cooling valve (DC-V-2B) and actuator replacement under WO 4185962 on March 17, 2017

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 3 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:

- 1107-9, Station Blackout Diesel Generator test on January 25, 2017;
- 1303-4.13, monthly logic testing for emergency safeguards actuation system on January 26, 2017;
- OP-TM-919-201, FX-Y-1A/B FLEX diesel generator full load testing on January 26, 2017

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation (71114.06 – 1 sample)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine Exelon emergency drill and a simulator training evolution for crew D licensed operators on January 10, 2017, 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, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. Exelon planned for this evolution to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. 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.

**2. RADIATION SAFETY**

**Cornerstone: Occupational and Public Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 - 1 sample)

a. Inspection Scope

The inspectors reviewed Exelon's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR 20, technical specifications, applicable Regulatory Guides (RGs), and the procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators for the occupational exposure cornerstone, radiation protection program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

## Radiological Hazard Assessment

The inspectors conducted walk downs of the facility and reviewed the radiological survey program, air sampling and analysis, continuous air monitor use, recent plant radiation surveys for radiological work activities, and any changes to plant operations since the last inspection to verify survey adequacy of any new radiological hazards for onsite workers or members of the public.

### b. Findings

No findings were identified.

## 2RS2 Occupational ALARA Planning and Controls (71124.02 - 3 samples)

### a. Inspection Scope

The inspectors assessed Exelon's performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements contained in 10 CFR 20, applicable RGs, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

### Inspection Planning

The inspectors conducted a review of TMI's collective dose history and trends, ongoing and planned radiological work activities, previous post-outage ALARA reviews; radiological source term history and trends, and ALARA dose estimating and tracking procedures.

### Verification of Dose Estimates and Exposure Tracking Systems

The inspectors reviewed the current annual collective dose estimate; basis methodology; and measures to track, trend, and reduce occupational doses for ongoing work activities. The inspectors evaluated the adjustment of exposure estimates, or re-planning of work. The inspector reviewed post-job ALARA evaluations of excessive exposure.

### Source Term Reduction and Control

The inspectors reviewed the current plant radiological source term and historical trend, plans for plant source term reduction, and contingency plans for changes in the source term as the result of changes in plant fuel performance or changes in plant primary chemistry.

The inspectors observed radiological work activities and evaluated the use of shielding and other engineering work controls based on the radiological controls and ALARA plans for those activities.

### Problem Identification and Resolution

The inspectors evaluated whether problems associated with ALARA planning and controls were identified at an appropriate threshold and properly addressed in the corrective action program.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04 - 4 samples)

a. Inspection Scope

The inspectors reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the requirements in 10 CFR 20, RGs, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed: radiation protection program audits, National Voluntary Laboratory Accreditation Program (NVLAP) dosimetry testing reports, and procedures associated with dosimetry operations.

Source Term Characterization

The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) being monitored. The inspector verified the use of scaling factors to account for hard-to-detect radionuclides in internal dose assessments.

External Dosimetry

The inspectors reviewed: dosimetry NVLAP accreditation, onsite storage of dosimeters, the use of "correction factors" to align electronic personal dosimeter results with NVLAP dosimetry results, dosimetry occurrence reports, and corrective action program documents for adverse trends related to external dosimetry.

Special Dosimetric Situations

The inspectors reviewed: Exelon's worker notification of the risks of radiation exposure to the embryo/fetus, the dosimetry monitoring program for declared pregnant workers, external dose monitoring of workers in large dose rate gradient environments, and dose assessments performed since the last inspection that used multi-badging, skin dose or neutron dose assessments.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with occupational dose assessment were identified at an appropriate threshold and properly addressed in the corrective action program.

b. Findings

No findings were identified.



#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151 – 2 samples)

###### Reactor Coolant System Specific Activity and Reactor Coolant System Leak Rate (BI01 and BI02)

###### a. Inspection Scope

The inspectors reviewed Exelon's submittal for the reactor coolant system (RCS) specific activity and RCS system leak rate performance indicators for TMI for the period of April 1, 2016 through December 31, 2016. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements of RCS leakage, and compared that information to the data reported by the performance indicator. Additionally, the inspectors observed surveillance activities that determined the RCS identified leakage rate, and chemistry personnel taking and analyzing an RCS sample.

###### b. Inspection Findings

No findings were identified.

##### 4OA2 Problem Identification and Resolution (71152 – 1 sample)

###### .1 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 and management meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Exelon performed an evaluation in accordance with 10 CFR 21.

###### b. Findings

No findings were identified.

.2 Annual Sample: Voiding in Makeup System Suction Piping (issue reports 2690835 and 2690845)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's evaluation and corrective actions following the identification of gas voids in the suction piping of the makeup (MU) system. The inspectors reviewed condition reports that documented the identification, evaluation, and corrective actions taken to address the voids. Specifically, the inspectors reviewed Exelon's evaluation that determined the source of the gas, interim corrective actions to appropriately manage continued gas accumulation through the operating cycle, and final corrective actions to eliminate the cause of void formation. In addition to review of these documents, the inspectors interviewed engineers to determine whether the scope of the corrective actions addressed the identified deficiencies.

The inspectors assessed Exelon's evaluation, extent of condition review, completed and proposed corrective actions, and the prioritization and timeliness of actions to evaluate whether the actions taken by Exelon were appropriate. Inspectors evaluated whether the interim corrective actions which included increased monitoring of the suction piping, review of possible sources of air, and subsequent testing of MU tank levels and pressures resulted in appropriate conclusions related to the cause of the gas formation and that operability of the system was maintained. The inspectors also evaluated Exelon's determination that the cause of the voids was a result of changes in the operation of the MU tank. Specifically, the inspectors assessed Exelon staff's determination that the changes in operating characteristics of the MU tank were the cause of the void formation. Additionally, Exelon identified that this change was caused by a degraded reactor coolant pump (RCP) seal (one of three fully capable seals) which resulted in an increased amount of inventory being removed from the MU tank and increased frequency of hydrogen and water additions to the tank. The inspectors also assessed if long term corrective actions which included replacement of the RCP seal and installation of an additional vent on the MU suction pipe stopped the formation of voids. Finally, the inspectors walked down the MU suction piping and pumps to determine if the equipment and piping were installed in accordance with drawings and if indication of gas existed.

b. Findings and Observations

No findings were identified.

The inspectors determined that Exelon's evaluation and extent-of-condition review were thorough and the causes were appropriately identified. The inspectors also concluded that the corrective actions were reasonable and addressed interim operability concerns until final corrective actions could be completed. Finally, the inspectors concluded that corrective actions adequately corrected the cause of the gas formation.

The inspectors found that Exelon staff determined that the amount of water that was transferred from MU tank to the suction of the MU pumps had significantly increased as a result of the RCP leakage and resulted in increased routine pressure cycling of the MU tank and the associated MU system suction piping. Following a review of testing of the MU tank performed by Exelon at various pressures and levels, the inspectors concluded that gas void formation in the suction piping occurred when the MU tank pressure was reduced on hydrogen saturated water from the MU tank.

This pressure decrease led to hydrogen coming out of solution. Exelon concluded in their apparent cause and troubleshooting evaluation that increasing flow of saturated water into the suction of the MU system combined with the increased cycling of suction pressure due to tank level changes resulted in the suction pipe gas void formation. The inspectors reviewed the MU tank operation during the previous cycle and determined that it clearly showed the pressure transients due to the increased flow of water from the tank following the identification of RCP seal leakage. The inspectors concluded that this degradation resulted in a significant increase in the rate of change and frequency of pressure cycling of the MU tanks and suction piping compared to normal operation of the tank without a RCP seal leak and Exelon's conclusion that this was the cause of the gas void formation was reasonable. Finally, the inspectors noted that following replacement of the RCP seal the MU tank returned to normal operation and there had been no voids identified in the systems.

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 - 3 samples)

##### .1 Plant Events

###### a. Inspection Scope

On January 31, 2017, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems associated with main condenser hotwell level controller malfunction and plant transient due to an instrument airline copper tubing leak. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in Inspection Manual Chapter 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 Parts 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the event to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance.

###### b. Findings

No findings were identified.

##### .2 (Closed) Licensee Event Report (LER) 05000289/2017-001-00: Low Temperature Over-Pressurization (LTOP) Technical Specification Requirements Were Not Met

On December 5, 2016, TMI was in cold shutdown and filling the reactor coolant system in preparation for plant startup following a planned maintenance outage (T1M10) that replaced a degraded 'A' RCP seal package. During system filling, it was determined by the operating crew that plant limits and precautions were not adhered to regarding LTOP. Specifically, with reactor coolant inventory high (pressurizer level > 100 inches indicated), high pressure make-up pump breakers were racked in for approximately three hours, contrary to Technical Specification 3.1.12.1. The crew took immediate actions to reduce pressurizer level to <100 inches. The enforcement aspects of this issue are discussed in NRC integrated inspection report 2016004, section 4OA7 (ML17039B042). The inspectors did not identify any new issues during the review of the LER. This LER is closed.

.3 (Closed) Licensee Event Report (LER) 05000289/2017-002-00: Leak at High Pressure Connection on Reactor Coolant Pump 'A' Thermal Barrier

On December 7, 2016, TMI had recently achieved hot shutdown conditions in preparation for plant start-up following a planned maintenance outage (T1M10) that replaced a degraded 'A' RCP seal package. During hot-pressurized walkdowns in the reactor building, a leak was discovered on a high-pressure welded connection of the 'A' RCP thermal barrier. This was determined to be reactor coolant leakage. Operators entered Technical Specification 3.1.6, "Leakage," action 4 and placed the plant in a cold shutdown condition within 24 hours of detection. The location of the leak was identified at the welded connection between the thermal barrier and a pipe that leads to a blank flange. The cause of the leak was due to a latent weld defect reducing the fatigue strength of the connection. Exelon corrected the issue by removing the degraded pipe and flange connection and installing a welded plug as a code-compliant repair, as this connection was no longer in use as of November 2015 as a result of RCP seal upgrades/modification. Additionally, Exelon conducted an extent of condition review for the remaining RCPs for additional leaks from similarly configured welded connections. No leakage or degraded connections were observed as a result of the extent of condition inspection. Additional non-destructive inspection of accessible piping did not identify any additional issues. Subsequent inspections after returning to a hot-pressurized condition were satisfactory. No findings or violations of NRC requirements were identified during the review of the licensee event report. This LER is closed.

4OA5 Other Activities

Temporary Instruction (TI) 2515/192, "Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems."

a. Inspection Scope

The objective of this performance-based TI is to verify implementation of interim compensatory measures associated with an open phase condition (OPC) design vulnerability in electric power system for operating reactors. The inspectors conducted an inspection to determine if Exelon had implemented the following interim compensatory measures at TMI. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for OPC design vulnerability. The inspectors verified the following:

- Exelon had identified and discussed with TMI plant staff the lessons-learned from the OPC events at the US operating plants including the Byron station OPC event and its consequences. This includes conducting operator training for promptly diagnosing, recognizing consequences, and responding to an OPC event;
- Exelon had updated TMI plant operating procedures to help operators promptly diagnose and respond to OPC events on off-site power sources credited for safe shutdown of the plant;
- Exelon had established and continue to implement periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits at TMI to detect a visible OPC.

- Exelon had ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained at TMI. As part of the maintenance and testing activities, Exelon assessed and managed TMI plant risk in accordance with 10 CFR 50.65(a) (4) requirements.

b. Findings and Observations

No findings were identified. The inspectors verified that the criteria were met.

4OA6 Meetings, Including Exit

On April 21, 2017, the inspectors presented the inspection results to Mr. Ed Callan, 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.

**ATTACHMENT: SUPPLEMENTARY INFORMATION**

**SUPPLEMENTARY INFORMATION  
KEY POINTS OF CONTACT**

Licensee Personnel

E. Callan	Site Vice President
T. Haaf	Plant Manager
T. Alvey	Manager, Chemistry
D. Atherholt	Manager, Regulatory Assurance
S. Batts	Operations Training Exam Developer
P. Bennett	Manager, Design Engineering
A. Bracke	Supervisor, Senior Reactor Operator
R. Campbell	Manager, Site Security
E. Carreras	Operations Training Manager
D. DiVittore	Manager, Radiological Engineering
M. Fitzwater	Senior Regulatory Assurance Engineer
G. Herneisey	LORT Lead Instructor
D. Herr	System Engineer
E. Johnson	Supervisor, Senior Reactor Operator
R. Masoero	Engineer, In-Service Testing
G. McCarty	Manager, Radiological Engineering
V. Mulchany	System Engineer
J. Piazza	Senior Manager, Design Engineering
J. Sherk	Engineer, Design Engineering
G. Smith	Director, Maintenance
B. Shumaker	Manager, Emergency Preparedness
J. Tesmer	Simulator Supervisor
N. Favorito	Shift Manager, Operations
D. Williams	Shift Manager, Operations

Other Personnel

S. Martin	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

05000289/2017-001-00	LER	Low Temperature Over-Pressurization (LTOP) Technical Specification Requirement Were Not Met (Section 4OA3.2)
05000289/2017-002-00	LER	Leak at High Pressure Connection on Reactor Coolant Pump 'A' Thermal Barrier (Section 4OA3.3)

**LIST OF DOCUMENTS REVIEWED****Section 1R01: Adverse Weather Protection**Procedures

OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 15  
 OP-TM-108-111-1001, TMI Severe Weather and Site Inaccessibility Guidelines, Revision 10  
 OP-TM-EOP-001, Reactor Trip, Revision 16  
 OP-TM-EOP-012, Station Blackout, Revision 2  
 OP-TM-AOP-004, Tornado / High Winds, Revision 7  
 OP-TM-AOP-020, Loss of Station Power, Revision 24  
 SY-AA-101-146, Severe Weather Preparation and Response, Revision 2

Miscellaneous

Issue Reports:           3984805           3984739           3984908

**Section 1R04: Equipment Alignment**Procedures

1104-19, Control Building Ventilation System, Revision 85  
 OP-TM-541-000, Primary Component Cooling, Revision 23

Drawings

302-620, Intermediate Cooling Flow Diagram, Revision 51  
 302-640, Decay Heat Removal – Flow Diagram, Revision 86  
 302-641, Decay Heat Removal – Pumps, Revision 6  
 302-645, Decay Heat – Closed Cycle Cooling Loop, Revision 39  
 302-847, Control Building Chilled Water Flow Diagram, Revision 23  
 1D-ISI-FD-002, ISI Boundary Sketch River Water System, Revision 28

Miscellaneous

Equipment Clearance for IC-C-1A  
 Equipment Clearance for System 213 (Decay Heat Removal)

Issue Reports:           3980727\*           3986153  
 Work Orders:           4364061           4349422

**Section 1R05: Fire Protection**Procedures

1038, Administrative Controls-Fire Protection Program, Revision 76  
 1038, Administrative Controls-Fire Protection Program, Revision 83  
 1301-12.22, Fire Door Inspection, Revision 22  
 OP-AA-201-009, Control of Combustible Material, Revision 18  
 OP-MA-201-007, Fire Protection System Impairment Control, Revision 6  
 Three Mile Island Nuclear Station Unit No.1 Pre-Fire Plan #1, Revision 1  
 Three Mile Island Nuclear Station Unit No.1 Pre-Fire Plan #31, Revision 4  
 Three Mile Island Nuclear Station Unit No.1 Pre-Fire Plan #81, Revision 4

Drawings

1-FHA-025, Fire Area Layout Auxiliary Bldg. & Air Intake Tunnel, Revision 7

Miscellaneous

CC-AA-309-101, Engineering Technical Evaluations, Revision 11  
990-1745, Three Mile Island Unit 1 Fire Hazards Analysis Report, Revision 27  
Three Mile Island Unit 1, Fire Plan and Strategies, Book 1, Revision 4

**Section 1R06: Flood Protection Measures**

Procedures

OP-TM-108-115, Functionality Assessment for Flood Barrier System Degradation, Revision 1  
3303-M1, Fire Pump Periodic Operation, Revision 48  
Alarm Response Procedure (PLA-8-9), Air Tunnel Deluge Sump Pump Run, Revision 10

Drawings

8-6489-16, Unit 1 Air Intake Tunnel, Revision, dated April 4, 1970  
302-231, Fire Service Water Flow Diagram, Revision 112  
302-352, Intermediate Building Air Tunnel, Revision 21  
1E-122-01-1007, TMI Flood Barrier System Air Intake Tunnel Sheet 1 and 2, Revision 3

Miscellaneous

990-1745, Three Mile Island Unit 1 Fire Hazards Analysis Report, Revision 27  
SDBD-T1-122, System Design Basis Document for Flood Protection Systems, Revision 3  
Technical evaluation of the performance of SD-P-7 (AIT sump pump) for the AIT deluge that occurred on January 10, 2017

Issue Reports: 1008179      3977349      3961531      3964502\*

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

Procedures

TQ-AA-224, Exelon Nuclear Training-Implementation Phase, Revision 10  
TQ-AA-150, Operator Training Programs, Revision 14

Miscellaneous

TQ-AA-224-F090, Performance Review Committee Data Sheet, Revision 7, completed 3/6/17  
TQ-AA-224-F100, Remedial Training Notification and Action on Failure, Revision 7, completed 3/3/17  
TMI-1 Operations Training Weekly LORT Annual Exam Status Report Week 6

Simulator Work Requests

0015997      0016822      0132686      0016812      0015497

Simulator Tests

Post Event Test OES35 – Dropped Rod, 08/26/2015  
Heater Drain Tube Leak, 03/25/2016  
Feedwater Heater Isolation, 06/13/16  
Simulator Accuracy Test SSP02, 02/25/16  
Transient Test OT-06 Turbine Trip, 02/13/16  
Transient Test OT-07 Maximum Power Ramp to 75% 02/13/16  
Core Performance Test for Certified Reactivity Manipulation, 04/14/16



Annual Operating Test and Written Exams

Written Exams – 2017 Annual Exam Cycle Weeks 4 and 5  
Scenarios and JPMs – 2017 Annual Exam Cycle Weeks 4 and 5

Issue Reports: 03985371      03987229

**Section 1R12: Maintenance Effectiveness**

Procedures

ER-AA-310, Implementation of the Maintenance Rule, Revision 9  
ER-AA-310-1005, Maintenance Rule – Dispositioning between (a)(1) and (a)(2), Revision 7  
ER-TM-310-1001, TMI Guidance for Maintenance Rule Unavailability Monitoring, Revision 5  
ER-AA-520, Instrument Performance Trending, Revision 4

Miscellaneous

MREQ 2704481-03-03

Reports:	3985712	2585022	1283655	0995297	0700038
Work Orders:	R2229514	R2191031	R2153392	R2113148	R2111971

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

Procedures

1082.1, TMI Risk Management Program, Revision 8  
OP-TM-108-117, Protected Equipment, Revision 2A  
OP-TM-108-117-1001, Protected Equipment Worksheets (Control Building Chilled Water System (Sys 827), Revision 2A  
WC-AA-101, On-Line Work Control Process, Revision 18

Drawings

302-082, Emergency Feedwater Flow Diagram, Revision 25

Miscellaneous

TMI-1 Protected Equipment Worksheet for 'B' Train CT Chilled Water, dated February 17, 2017  
TMI-1 UFSAR 10.6, Emergency Feedwater System, dated April 2008, Revision 19  
Technical Rigor Certification for Work Week 1709  
Technical Specifications, 3.4 Decay heat Removal (DHR) Capability, Amendment 242

Issue Report: 3982534

**Section 1R15: Operability Evaluations**

Procedures

1104-24N, OSF HVAC and Glycol Water Systems, Revision 19  
OP-AA-108-115, Operability Determinations, Revision 10  
OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability Determinations, Revision 2  
OP-TM-211-211, HPI Test, Revision 14  
OP-TM-541-233, IST of NR-P-1C and Valves, Revision 11  
OP-TM-541-234, IST of NR-P-1A and NRSW Valves During Single Pump Operation, Revision 6  
OPE-15-002, Low Margin on MU-P-1C Identified During HPI Flow Test, Revision 1  
EP-AA-120-1006, EP Reportability – Loss of Emergency Preparedness Capabilities, Revision 4

Calculations

C-1101-211-E540-091, TMI-1 IST Acceptance Criteria for HPI Pumps, Revision 3  
 C-1101-864-E420-001, SBO Battery Charger Sizing and Hydrogen Generation Calculation,  
 Revision 1  
 TMI-1 Technical Specification 3.3.1.1, Amendment 289  
 TMI-1 Technical Specification 4.5.2.1, Amendment 285

Drawings

302-202, Nuclear Service River Water Systems Flow Diagram, Revision 82

Miscellaneous

Equipment deficiency tag #935953  
 EEC 16-00266 Attachment 1, Technical Evaluation of Station Blackout (SBO) Diesel Generator  
 Battery (EED-B-3) Connection Resistance Values, Revision 0

Issue Reports:	2722807	3970284	2712595	3970395	3978314
	3967368	3963320	2581823	3979691	
WOs:	4352235	4386001			

**Section 1R18: Plant Modifications**Procedures

CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 20  
 CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, Revision 21  
 MA-AA-716-008, Foreign Material Exclusion Program, Revision

Drawings

1D-ISI-MU-035, Make Up Pump Suction, Revision 3  
 1D-ISI-FD-017, ISI Boundary Sketch for Make Up and Purification System, Revision 25  
 1D-212-23-001, Decay Heat Piping Analysis, Revision 2  
 302-661, Make-Up and Purification Flow Diagram, Revision 63

Miscellaneous

ECR-16-00297, Venting Improvement to MU-P-1A Suction Line, Revision 0

IR	2686804	2690845	2686946
WO	4187416		

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

OP-TM-211-000, Makeup and Purification System, Revision 33  
 OP-TM-211-208, IST of MU-P-1C, Revision 7A  
 OP-TM-211-242, MU-V-18 Stroke Test for IST, Revision 8  
 OP-TM-424-000, Emergency Feedwater System, Revision 4  
 OP-TM-424-901, Emergency Feedwater, Revision 4  
 OP-TM-424-201, IST of EF-P-2A, Revision 10  
 OP-TM-541-000, Primary Component Cooling, Revision 23  
 OP-TM-541-449, Remove IC-C-1A from Service, Revision 2  
 OP-TM-541-565, Draining IC-C-1A, Revision 0  
 WC- AA-101, On-Line Work Control Processes, Revision 26

Drawings

302-620, Intermediate Cooling Flow Diagram, Revision 51  
 302-660, Makeup and Purification Flow Diagram, Revision 47

Miscellaneous

Technical Specifications 3.4, Decay Heat Removal (DHR) Capability, Amendment 242  
 TMI-1 UFSAR10.6, Emergency Feedwater System, dated April 2008, Revision 19

Issue Reports:	2586803	2586304	2582026	2490915	3982621
	3986182	3986173			
Work Orders:	4390176	4391161	4571863	4342861	4185962

**Section 1R22: Surveillance Testing**Procedures

1107-9, SBO Diesel Generator, Revision 79  
 1303-4.13, RB Emergency Cooling and Isolation System Analog Test, Revision 48  
 OP-TM-919-201, FX-Y-1A/B Performance Testing, Revision 0  
 WC-TM-430, Surveillance Testing Program, Revision 0  
 WC-TM-430-1001, Surveillance Testing Program Database Interface and Maintenance,  
 Revision 1

**Section 1EP6: Drill Evaluation**Procedures

EP-AA-122, Drill and Exercise Program, Revision 18  
 EP-AA-122-200, Drill and Exercise Execution, Revision 2  
 EP-AA-1009, Emergency Action Levels for Three Mile Island (TMI)  
 EP-AA-1009, Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island  
 EP-AA-112 F-01, Command and Control Turnover Briefing Form, Revision G

**2RS1: Radiological Hazard Assessment and Exposure Control**Procedures:

RP-AA-302, Determination of Alpha Levels and Monitoring, Revision 8  
 RP-AA-300-1002, Electron Capture Isotope Control, Revision 6  
 RP-AA-410, Selection, Use, and Control of Protective Clothing, Revision 8  
 RP-AA-460, Controls for High and Locked High Radiation Areas, Revision 29  
 RP-AA-376, Radiological Posting, Labeling, and Markings, Revision 9  
 RP-AA-376-1001, Radiological Posting, Labeling, and Marking Standard, Revision 14  
 RP-AA-503, Unconditional Release Survey Method, Revision 14  
 RP-AA-503-F-01, Unconditional Release Instructions Using the Small Articles Monitor (SAM)  
 for Personal Items Used in the Radiologically Controlled Area (RCA) and in a  
 Contaminated Area, Revision 4

Miscellaneous

RWP TM-1-16-00633, Containment Outage Seal Replacement  
 Issue reports: 3948735      3948787      3948801      3949615      3951514

## **2RS2: ALARA Planning and Controls**

### Procedures:

RP-AA-400-1002, Dose Equalization, Revision 2  
RP-AA-401, Operational ALARA Planning and Controls, Revision 22

### Miscellaneous

PI-AA-126-1005-F-01, Fleet ALARA Program, September 22, 2016  
ALARA Plan AP-16-013, Containment Outage Seal Replacement, 50%, 80% Work In progress  
Reviews and Post Job Review

## **2RS4: Occupational Dose Assessment**

### Procedures

RP-AA-203, Exposure Control and Authorization, Revision 5  
RP-AA-203-1001, Personnel Exposure Investigations, Revision 9  
RP-AA-203-1002, Response to Electronic Dosimeter (EPD) Reset Alarms  
(REMS Error Message #795), Revision 1  
RP-AA-210, Dosimetry Issue, Usage, and Control, Revision 27  
RP-AA-220, Bioassay Program, Revision 12  
RP-AA-222, Methods for Estimating Internal Exposure from In VIVO and In VITRO  
Bioassay Data, Revision 5  
RP-AA-223, Calculating and Crediting Dose from Tritium Exposure, Revision 1  
RP-AA-224, CEDE Dose Tracking Using Lapel Air Samplers, Revision 2  
RP-AA-250, External Dose Assessment from Contamination, Revision 7

### Miscellaneous

PI-AA-126-1005-F-01, Radiation Protection Dosimetry, May 27, 2016

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

### Procedures

OP-TM-220-251, RCS Leak Rate Determination, Revision 13A  
LS-AA-2100, Monthly Data Element for NRC Reactor Coolant System Leakage, Revision 5  
LS-AA-2090, Monthly Data Element for NRC Reactor Coolant System Specific Activity,  
Revision 4

### Miscellaneous

TMI Leak Rate and activity database to PI indicator, December 31, 2016

## **Section 4OA2: Problem Identification and Resolution**

### Procedures

OP-TM-211-205, IST of MU-P-1A, Revision 13  
OP-TM-211-481, Hydrogen Addition to MU-T-1, Revision 7  
OP-TM-221-000, Makeup and Purification System, Revision 33

### Calculations

C-11-1-211-E610-066, Makeup Tank Level & Pressure Limits, Revision 9

Drawings

1D-ISI-DH-004, DH System – Aux. Bldg. From Penetration 303, 306 & 310, Revision 2  
 1D-ISI-DH-007, Decay Heat Removal Auxiliary Bldg., Revision 3  
 1D-ISI-DH-012, Decay Heat Removal 10" Line From BWST, Revision 1  
 1D-ISI-DH-019, Decay Heat Removal Cooler DH-CIA Outlet, Revision 4  
 1D-ISI-MU-035, Make Up Pump Suction, Revision 3  
 302-660, Make-up and Purification Flow Diagram, Revision 47  
 302-661, Make-up and Purification Flow Diagram, Revision 63  
 D-68-80-5, 8'0 x 13'0" Overall Makeup Tank, Revision 5  
 SK-DH-A-001, Decay Heat "A" Train Piping Isometric, Revision 0  
 SK-DH-B-001, Decay Heat "B" Train Piping Isometric, Revision 0

Miscellaneous

ER-AA-335-007, Att. 1, Ultrasonic Fluid Solid/ Sediment Data Sheet for WO 14600466,  
 dated 3/17/17  
 ER-AA-335-007, Att. 1, Ultrasonic Fluid Solid/ Sediment Data Sheet for WO 04601981,  
 dated 3/07/17  
 MA-AA-716-004, Complex Troubleshooting Data Sheet for IR 2708286, completed 9/6/16  
 MU Tank - Level and pressure data from 3/20/17 to 3/22/17  
 MU Tank - Level and pressure data from 6/28/16 to 7/01/16  
 RCDT – Tank level data 11/22/15 to 6/19/2016  
 RCDT - Tank level data 12/13/16 to 3/27/2017  
 TM 16-00297-000, Venting Improvement To MU-P-1A Suction Line, dated 10/19/16

Issue Reports: 763395      2607140      2611969      2677924      2686804  
 Work Orders: R2275688    R2281293    04600466

**Section 40A3: Followup of Events and Notices of Enforcement Discretion**Procedures

NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, Revision 3

Miscellaneous

TMI-1 LER 2017-002-00, Leak at Low Pressure Connection on Reactor Coolant Pump 'A'  
 Thermal Barrier  
 ECR 13-00099, Engineering Change Request for RCP seal modification  
 RC-P-1A Leak Root Cause Report

Issue Report: 3950464

**Section 40A5: Other Activities**Procedures

ER-AA-2030, "Conduct Plant Engineering" Revision 18  
 MAP AA, "Main Annunciator Panel AA" Revision 36  
 MAP B, "Main Annunciator Panel B" Revision 56  
 MA-AA-716-230-1003, "Thermography Program Guide" Revision 4  
 OP-TM-108-107, "Switchyard Control" Revision 4  
 OP-TM-108-107-1002, "TMI Transmission Interactions that Impact Operations, Engineering,  
 Work Management, and maintenance that includes First Energy Interface Agreement  
 and NERC Standards" Revision 9

OP-TM-108-107-1002, "TMI Transmission Interactions that Impact Operations, Engineering, Work Management, and maintenance that includes First Energy Interference Agreement and NERC Standards" Revision 9  
OP-TM-MAP-F0301, "RC Loop A Flow Lo" Revision 2  
OP-TM-MAP-F0302, "RC Loop B Flow Lo" Revision 2  
WC-AA-104, "Integrated Risk Management" Revision 24  
WC-TM-8003-1009, "Three Mile Island Unit 1 Nuclear Plant Interface Requirements (NIPRs)" Revision 2  
TQ-TM-106-MOD-C002, "T1R20 Modifications"  
TQ-TM-104-701-C002, "TMI Grid Operations"  
TQ-TM-104-721-C001, "Protective Relaying for main Generator, Main Transformers, Auxiliary Transformations, and Substation"

Miscellaneous

Check-in self-assessment: TI-192; (AR03944676)  
ECR 12-00240, "Install Loss of Phase Relay" Revision 0  
NRC Informational Notice 2012-03, "Design Vulnerability in Electric Power System"  
NRC Temporary Instruction 2515-192, "Inspection of the License's Interim Compensatory measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems"  
Operability Evaluation 12-002, "Operability Evaluation for Byron Loss of Phase Event"  
  
Issue Reports: 1319908, "B2F26 U2 RCTR Trip Due to Electrical Fault and Unusual Event"  
1322450, "Additional Loss of Phase Design Analysis"  
3829874, "OPEX Review of Byron U2 Loss Phase Event"

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
CFR	<i>Code of Federal Regulations</i>
DRP	Division of Reactor Projects
IR	inspection report
JPM	job performance measure
LER	licensee event report
LTOP	low temperature over-pressurization
MU	makeup
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
OPC	open phase condition
RCP	reactor coolant pump
RCS	reactor coolant system
RG	Regulatory Guide
SRO	senior reactor operator
SSC	structure, system, and component
TI	Temporary Instruction
TMI	Three Mile Island Unit 1
UFSAR	Updated Final Safety Analysis Report