



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

November 2, 2015

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

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – INTEGRATED INSPECTION REPORT  
5000289/2015003

Dear Mr. Hanson:

On September 30, 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 October 16, 2015, with Mr. E. Callan, TMI Site Vice President, and other members of your staff.

NRC inspectors 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.

The inspectors documented one finding of very low safety significance (Green) in this report. This finding did not involve a violation of NRC requirements.

In accordance with Title 10 of the *Code of Federal Regulations* 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's 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 No. 50-289  
License No. DPR-50

Enclosure:  
Inspection Report 05000289/2015003  
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: 05000289/2015003

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Dates: July 01 through September 30, 2015

Inspectors: D. Werkheiser, Senior Resident Inspector  
T. Daun, Acting Senior Resident Inspector  
J. Heinly, Resident Inspector  
J. Furia, Senior Health Physicist  
H. Gray, Senior Reactor Inspector  
M. Modes, Senior Reactor Inspector  
R. Rolph, Health Physicist

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

Enclosure

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## SUMMARY

IR 05000289/2015003, 07/01/2015-09/30/2015; Three Mile Island, Unit 1, Flood Protection Measures.

This report covers a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified one finding of very low safety significance (Green). 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 April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of Nuclear Regulatory Commission (NRC) requirements are dispositioned in accordance with the NRC Enforcement Policy, dated February 4, 2015. The NRC program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding because Exelon failed to meet a commitment made during original licensing to mitigate an internal flooding event. Specifically, Exelon committed to making changes to the fire water supply system to mitigate the impact of a pipe rupture in the auxiliary building. The inspectors identified that the commitment actions were not completed and no changes to the commitment were identified. The inspectors determined that the failure to perform the modifications to the fire service system, as committed to the NRC in a letter dated November 10, 1972, was a performance deficiency that was reasonably within its ability to foresee and correct. Exelon documented the issue in issue report 2544387, performed an immediate operability evaluation, and developed corrective actions to restore compliance with the commitment.

The inspectors determined that the performance deficiency is associated with the Mitigating Systems cornerstone attribute of protection against external factors (internal flood hazard) and is more than minor because it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency adversely impacted the operator's ability to detect and mitigate a fire service system pipe rupture in the safety related auxiliary building. The inspectors utilized IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," to determine the significance of the performance deficiency. The inspectors determined the finding to be of very low safety significance (Green) because the finding is not a design or qualification deficiency, does not represent a loss of system safety function or loss of a single train for greater than its allowed technical specification time, does not result in the loss of a high safety-significant maintenance rule train and does not involve the loss of function to mitigate internal flooding events.

The finding is not assigned a cross-cutting aspect because the performance deficiency occurred during original plant construction and is not indicative of current plant performance. (Section 1R06)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On July 14, 2015, an automatic runback occurred due to a dropped control rod, and operators stabilized reactor power at approximately 57 percent. To facilitate continued operation during troubleshooting and repairs, operators reduced power to approximately 37 percent. It was determined that a manufacturing defect in the single rod power supply (SRPS) had resulted in an electrical transient, causing power to be lost to the control rod drive for the affected control rod. Following repairs, operators recovered the control rod and returned the unit to 100 percent power on July 17. On September 5, operators reduced power to 89 percent power for planned turbine valve testing and returned to 100 percent power on September 6. 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)

##### External Flooding

##### a. Inspection Scope

During the week of July 8, 2015, the inspectors performed an inspection of the external flood protection measures for Three Mile Island (TMI). The inspectors reviewed technical specifications (TSs); procedures; design documents; and the updated final safety analysis report (UFSAR), Chapter 2.4.2.4, which depicted the design flood levels and protection areas containing safety-related equipment, to identify areas that may be affected by internal flooding. The inspectors conducted a general site walkdown of all external areas of the plant, including plant discharge penetrations through the dike to ensure that Exelon erected flood protection measures in accordance with design specifications. The inspectors also reviewed operating procedures for mitigating external flooding during severe weather to determine if Exelon planned or established adequate measures to protect against external flooding events. 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 – 3 samples)

##### a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'B' control building chiller alignment during 'A' control building chiller planned maintenance on September 1, 2015

- Primary instrument air lineup during instrument air leak mitigation in turbine building level 305' and repair on September 14 and 15, 2015
- Turbine bypass valve control line-up during main steam valve isolation (MS-V-2A/B) in-service testing on September 21, 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 UFSAR, TSs, 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.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

On August 13, 2015, the inspectors performed a complete system walkdown of accessible portions of the 'A' emergency diesel generator (EDG) to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related issue reports and work orders to ensure Exelon appropriately evaluated and resolved any deficiencies.

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.

- 'B' EDG (DG-FA-2) on July 13, 2015
- Fuel handling building 281' (FH-FZ-1) on August 27, 2015
- Installation of 3-hour fire seal to support Diverse and Flexible Coping Strategies "FLEX" power conduit installation at penetration No. 1339 (control building 322' elevation) under work order C2033420 on September 18, 2015
- Fire protection features supported by and for the 'B' natural draft cooling tower on September 25, 2015
- Intermediate building 305' corridor (IB-FZ-5) on September 25, 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, 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 their review on non-seismic pipe ruptures in the turbine building and the auxiliary building heat exchanger vault 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

Introduction. The inspectors identified a green finding because Exelon failed to meet a commitment made during original licensing to mitigate an internal flooding event. Specifically, Exelon committed to making changes to the fire water supply system to mitigate the impact of a pipe rupture in the auxiliary building. The inspectors identified that the commitment actions were not completed and no changes to the commitment were identified.

Description. The inspector's review of TMI's internal flooding design basis identified that not all aspects of the sites mitigation strategy had been incorporated into the current UFSAR. Therefore, the inspectors performed a detailed historical review of their design and licensing basis requirements and commitments. The inspectors identified that during original TMI plant licensing, the Atomic Energy Commission requested that Exelon (formerly GPU Nuclear) review the TMI design "...to determine whether the failure of any non-category I (Seismic) equipment, particularly in the circulating water system and fire protection system, could result in a condition, such as flooding or the release of chemicals, that might potentially adversely affect the performance of safety-related equipment required for safe shutdown of the facilities or to limit the consequences of an accident." Exelon's review, in part, identified a vulnerability in

the auxiliary building where a 12" fire main rupture had the potential to impact safety related equipment. In response to the vulnerability, Exelon committed to making three modifications to the plant to minimize the threat and provide additional operator alarms. Specifically, Exelon committed to relocating a fire service system branch connection outside of the auxiliary building, installing orifices and a low pressure switch just outside of the auxiliary building, and adding a low pressure alarm indication to alert the operators of a fire main pipe rupture. This commitment was referenced in the original plant safety evaluation report that supported the issuance of TMI's operating license.

The inspectors performed detailed design drawing reviews and walkdowns of the fire service system in the auxiliary building. The inspectors identified that the committed changes to the fire service system, as mentioned above, were not completed and the current fire main rupture mitigation strategy was not consistent with their original licensing basis commitment. Exelon documented the issue in issue report 2544387 and performed an immediate operability evaluation. Operability of the auxiliary building safety related systems, structures and components (SSCs) were supported by crediting existing control room alarms and field operators to identify any fire service system leaks before safety related equipment would be impacted. Furthermore, Exelon has corrective actions planned to restore compliance with the commitment.

Analysis. The inspectors determined that the failure to perform the modifications to the fire service system, as committed to the NRC in a letter dated November 10, 1972, was a performance deficiency that was reasonably within its ability to foresee and correct, and should have been prevented. Using IMC 0612, Appendix A, "Issue Screening," the inspectors determined that the performance deficiency is associated with the Mitigating Systems cornerstone attribute of protection against external factors (internal flood hazard) and is more than minor because it adversely affected the cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency adversely impacted the operator's ability to detect and mitigate a fire service system pipe rupture in the safety related auxiliary building.

The inspectors utilized IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," to determine the significance of the performance deficiency. The inspectors determined the finding to be of very low safety significance (Green) because the finding is not a design or qualification deficiency, does not represent a loss of system safety function or loss of a single train for greater than its allowed technical specification time, does not result in the loss of a high safety-significant maintenance rule train and does not involve the loss of function to mitigate internal flooding events.

The finding is not assigned a cross-cutting aspect because the performance deficiency occurred during original plant construction and is not indicative of current plant performance.

Enforcement. No violation of NRC regulatory requirements occurred. However, Exelon's letter regarding internal flooding evaluation contained a commitment that was not met which constituted a performance deficiency and a finding. This finding is of very low safety significance and has been entered into Exelon's corrective action program (issue report 2544387). **(FIN 05000289/2015003-01, Internal Flooding Licensing Basis Commitment Not Met)**

1R08 Inservice Inspection Activities (71111.08P)Steam Generator Tube Inspection Activitiesa. Inspection ScopeThree Mile Island Station, Steam Generator Tube eddy current testing preparation for the Unit 1, 21<sup>st</sup> refueling outage

During the TMI, 20<sup>th</sup> refueling outage (1R20), Exelon's staff completed eddy current testing to examine the condition of the tubes in steam generators (SGs) "A" and "B." As a result, they identified indications of increased tube-to-tube support plate wear. NRC inspectors reviewed the examination results and the subsequent SG condition monitoring and operational assessment document completed by Exelon. The results of these inspections are documented in NRC inspection reports dated February 10, 2013, and November 13, 2014 (Agencywide Documents Access and Management System ML14041A047 and ML14317A309 respectively).

On July 1, 2015, inspectors met with Exelon staff to discuss plans for SG tube examinations during the TMI 1R21 refueling outage. The inspectors determined Exelon plans to complete eddy current testing examinations, including bobbin coil probe, of 100 percent of the tubes in both the "A" and "B" SGs. The inspectors discussed Exelon's plans with regard to industry SG examination program guidelines and the requirements of TMI's technical specifications.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11Q – 2 samples).1 Quarterly Review of Licensed Operator Regualification Testing and Traininga. Inspection Scope

The inspectors observed licensed operator simulator training on August 4, 2015, which included a loss of coolant accident that resulted in a loss of subcooling margin and the failure of select components to automatically start as required. 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 TS 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

a. Inspection Scope

The inspectors observed control room operations in support of recovering a dropped control rod and power escalation conducted on July 16 and July 17, 2015. 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 000. 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.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on 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 *Code of Federal Regulations* (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's staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Control tower chiller maintenance on July 21, 2015
- Control rod system (system 622) due to digital control drive control system SRPS system failure for control rod 5-1 on July, 30, 2015
- Engineered Safeguards Activation System (ESAS) relay maintenance impact on 4 kilovolt maintenance rule function on September 25, 2015

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 3 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 TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Planned yellow risk for maintenance on 1A building spray pump (BS-P-1A) on July 31, 2015
- Planned risk mitigation actions for a 'B' ESAS relay replacement on August 24, 2015
- Station risk during planned 'A' station air compressor (IA-P-4) maintenance on September 23, 2015

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 2 samples)

a. Inspection Scope

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

- Power range channel NI-7 with unsatisfactory shift and daily checks for heat balance as documented in issue report 02535427, on July 31, 2015
- Aggregate review of operator work-arounds on August 26, 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 TS 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 TSs 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 Modificationsa. Inspection Scope

The inspectors evaluated a modification to the integrated control system rate-limiter implemented under work order R2255301 on September 6, 2015. 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 upgrade and design change, including installation of logic jumpers within the system card. The inspectors also reviewed revisions to the control room operating procedure regarding power maneuvers and interviewed engineering and operations personnel to ensure the procedure could be reasonably performed.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 4 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.

- ESAS relay replacement (63Z-1B/R-C3B) on July 23, 2015
- 'A' control tower chiller planned maintenance outage on September 4, 2015
- 'B' EDG ring catcher gasket replacement on September 10, 2015
- ESAS relay replacement (63Z-2E/R-B1A) on September 15, 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 TSs, 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:

- 'C' reactor protection system high flux trip setpoint change and nuclear instrumentation calibration on July 21, 2015
- 1410-T-1, tank inspection of fire service altitude tank (FS-T-1) on July 22, 2015 (in-service test)
- ST 1306-4.16, EDG (EG-Y-1A) monthly test on August 6, 2015
- 1450-001, 4160 volt motor feeder breaker functional test on September 8, 2015
- ST 1303-13.4, remote shutdown system functional test of the 'B' EDG output breaker (G11-02) under work order R2226832 on September 18, 2015

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 on July 28, 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.

**2. RADIATION SAFETY**

**Cornerstone: Occupational and Public Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

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, TSs, applicable Regulatory Guides (RGs), and the procedures required by TSs 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 reviewed recent plant radiation surveys and any changes to plant operations since the last inspection to identify any new radiological hazards for onsite workers or members of the public.

### Instructions to Workers

The inspectors reviewed several occurrences where a worker's electronic personal dosimeter alarmed. The inspectors reviewed Exelon's evaluation of the incidents, documentation in the corrective action program, and whether compensatory dose evaluations were conducted when appropriate.

### Contamination and Radioactive Material Control

The inspectors observed the monitoring of potentially contaminated material leaving the radiological control area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material.

### Radiological Hazards Control and Work Coverage

The inspectors evaluated in-plant radiological conditions during facility walk-downs and observation of radiological work activities. The inspectors assessed whether posted surveys, radiation work permits, worker radiological briefings, the use of continuous air monitoring and dosimetry monitoring were consistent with the present conditions. The inspectors examined the posting and physical controls for selected high radiation areas (HRAs) and locked high radiation areas to verify conformance with the occupational performance indicator.

### Risk-Significant HRA and Very High Radiation Area (VHRA) Controls

The inspectors reviewed the controls and procedures for HRAs, VHRAs, and radiological transient areas in the plant.

### Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were identified at an appropriate threshold and properly addressed in the corrective action program.

#### b. Findings

No findings were identified.



## 2RS2 Occupational ALARA Planning and Controls (71124.02)

### 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, TSs, and procedures required by TSs 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; 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.

#### 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.

#### 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)

### a. Inspection Scope

The inspectors reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the requirements in 10 CFR 20, RGs, TSs, and procedures required by TSs 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.

### 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.

#### b. Findings

No findings were identified.

### 2RS7 Radiological Environmental Monitoring Program (71124.07 - 1 sample)

#### a. Inspection Scope

The inspectors reviewed the radiological environment monitoring program (REMP) to validate the effectiveness of the radioactive gaseous and liquid effluent release program. The inspectors used the requirements in 10 CFR 20; 40 CFR 190; 10 CFR 50 Appendix I; and the site’s TSs, Offsite Dose Calculation Manual (ODCM), and procedures required by TSs as criteria for determining compliance.

### Inspection Planning

The inspectors reviewed: Exelon - Three Mile Island 2013 and 2014 annual radiological environmental reports, REMP program audits, ODCM changes, land use census, and inter-laboratory comparison program results.

### Onsite Inspection

The inspectors reviewed and/or observed the following:

- Sample collection, monitoring, and dose measurement stations (e.g., thermoluminescent dosimeter, air monitoring, vegetation, milk)
- Calibration and maintenance records for air sample and dosimetry measurement equipment
- Environmental sampling of the effluent release pathways specified in the ODCM
- Meteorological tower and meteorological data readouts
- Meteorological instrument operability status and calibration results
- Missed and anomalous environmental samples identified, resolved, and reported in the annual radioactive environmental monitoring report
- Positive environmental sample assessment results
- The groundwater monitoring program as it applies to selected potential leaking SSCs
- 10 CFR 50.75(g) records of leaks, spills, and remediation since the previous inspection
- Changes to the ODCM due to changes to the land use census, long-term meteorological conditions, and/or modifications to the environmental sample stations
- Environmental sample laboratory analysis results, and measurement detection sensitivities
- Results of the laboratory quality control program audit, and the inter-and intra-laboratory comparison program results

### Identification and Resolution of Problems

The inspectors evaluated whether problems associated with the REMP were identified at an appropriate threshold and properly addressed in TMI's corrective action program.

#### b. Findings

No findings were identified.

### 2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 1 sample)

#### a. Inspection Scope

The inspectors verified the effectiveness of TMI's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR 170-177; 10 CFR 20, 37, 61, and 71; applicable industry standards; RGs, and procedures required by TSs as criteria for determining compliance.

#### Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

#### Radioactive Material Storage

The inspectors observed radioactive waste container storage areas and verified that TMI had established a process for monitoring the impact of long-term storage of the waste.

#### Radioactive Waste System Walk-down

The inspectors walked down the following items and areas:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition
- Abandoned in place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

#### Waste Characterization and Classification

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

### Shipment Preparation

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness.

### Shipping Records

The inspectors reviewed selected non-excepted package shipment records.

### Identification and Resolution of Problems

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were identified at an appropriate threshold and properly addressed in TMI's corrective action program.

#### b. Findings

No findings were identified.

## 4. **OTHER ACTIVITIES**

### 4OA1 Performance Indicator Verification (71151)

#### .1 Radiological Effluent TS/ODCM Radiological Effluent Occurrences (1 sample)

##### a. Inspection Scope

The inspectors reviewed licensee submittals for the radiological effluent TS/ODCM radiological effluent occurrences performance indicator (PI) for the 1<sup>st</sup> and 2<sup>nd</sup> quarter 2015. The inspectors used PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, Revision 7, to determine if the PI data was reported properly. The inspectors reviewed the public dose assessments for the PI for public radiation safety to determine if related data was accurately calculated and reported.

The inspectors reviewed the corrective action program database to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent summary data and the results of associated offsite dose calculations to determine if indicator results were accurately reported.

##### b. Findings

No findings were identified.

#### .2 Safety System Functional Failures (1 sample)

##### a. Inspection Scope

The inspectors sampled Exelon's submittals for the Safety System Functional Failures PI for TMI for the period of July 1, 2014 through September 30, 2015. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator

Guideline,” Revision 7, and NUREG-1022, “Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73.” The inspectors reviewed Exelon’s operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index (5 samples)

a. Inspection Scope

The inspectors reviewed Exelon’s submittal of the mitigating systems PI for the following systems for the period of July 1, 2014 through September 30, 2014:

- [MS 06] Emergency AC Power System (EDGs)
- [MS 07] High Pressure Safety Injection System (Make-up)
- [MS 08] Emergency Feedwater System
- [MS 09] Decay Heat Removal
- [MS 10] Cooling Water Support Systems (Decay Closed, Decay River, Nuclear Closed, Nuclear River)

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7. The inspectors also reviewed Exelon’s operator narrative logs, issue reports, mitigating systems performance index derivation 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 – 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 meetings.

b. Findings

No findings were identified.

.2 Annual Sample: 'A' Building Spray Pump (BS-P-1A) Oil Leak

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's troubleshooting and corrective actions associated with issue report 2473412, building spray pump 1A oil leakage at 6.6 drops per minute. Specifically, the 'A' building spray pump (BS-P-1A) developed an oil leak from the inboard bearing lip seal during a routine surveillance test.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Exelon's corrective action program and 10 CFR 50, Appendix B. In addition, the inspectors performed field walkdowns and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

No findings were identified.

Exelon performed extensive troubleshooting to determine the cause and appropriate corrective actions of the BS-P-1A bearing housing oil leak. Exelon performed an in-depth design review and precise in-field measurements that focused on the oil level, seal condition, operational practices and potentially degraded components that would result in the observed leakage. A prompt operability assessment concluded that the pump would remain operable given that the leakage rate remained below 7.5 drops per minute. Operator rounds were enhanced to ensure oil leakage remained in the operable region throughout the troubleshooting and repair period.

The safety-related building spray system is designed to mitigate the peak pressure transient in the reactor building during a large break loss of cooling accident. Specifically, the building spray system contains two fully redundant motor driven pumps to spray water through ring headers at the highest elevation in the reactor building to reduce building pressure. The building spray pump bearings are contained in a housing with a passive constant level oiler.

Exelon's troubleshooting identified multiple potential causes for the oil leakage such as degraded oil housing lip seal, overfilled housing, or a housing internal degraded condition. Exelon replaced the lip seal, constant level oiler and performed an internal inspection of the bearing housing and did not identify any obvious degraded conditions. The oil leak continued to persist as identified through post-maintenance testing. Exelon engaged the vendor, Flowserve, for further troubleshooting and failure-mode analysis assistance. Based upon their collective review, it was determined that the most likely cause was due to a degraded lip seal. The lip seals are delicate and are prone to damage during installation. Therefore, TMI replaced the lip seal with a more reliable

labyrinth seal design that had proven reliable on similar pump designs at TMI and significantly less susceptible to damage during installation. The post maintenance test and subsequent surveillance tests on BS-P-1A has shown consistent zero oil leakage performance.

The inspectors reviewed Exelon's prompt operability determination, augmented operator rounds, troubleshooting activities, and repair activities. The inspectors determined Exelon's overall response to the issue was commensurate with the safety significance, was timely, and included appropriate compensatory actions. In addition, the inspectors reviewed the alternate labyrinth seal design for any adverse impact on BS-P-1A and identified no issues of concern.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 - 1 sample)

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.

- Dropped control rod 5-1 due to failed control rod drive mechanism SRPSs and resulting main turbine runback on July 14, 2015

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On October 16, 2015, the inspectors presented the inspection results to Mr. Edward 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, TMI
T. Haaf	Plant Manager, TMI
T. Alvey	Manager, Chemistry
D. Atherholt	Manager, Regulatory Assurance
T. Bradley	Normndeau Associates
R. Campbell	Manager, Site Security
D. Divittore	Manager, Radiological Engineering
M. Fitzwater	Senior Engineer, TMI Regulatory Assurance
L. Friant	Steam Generator Engineer, Exelon Corporate
T. Heindl	Steam Generator Engineer
G. McCarty	Manager, Radiological Engineering
J. Piazza	Senior Manager, Design Engineering
T. Roberts	Manager, Radiation Protection Technical Support
B. Shumaker	Manager, Emergency Preparedness
C. Sinn	Shipper, Radiological Waste
G. Smith	Director, Maintenance
M. Torborg	Manager, Programs Engineering
L. Weber	Technical Services, Chemistry

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**

Opened/Closed

05000289/2015003-01	FIN	Internal Flooding Licensing Basis Commitment Not Met (Section 1R06)
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## LIST OF DOCUMENTS REVIEWED

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

#### Procedures

3301-SA1, Dike Inspection, Revision 17

SDBD-T1-122, System Design Basis Document for Flood Protection System, Revision 3

#### Miscellaneous

AR: A2364884

IRs: 2391187      2391174      2391179

WOs: R2246591      R2238529

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

#### Procedures

1107-3, Diesel Generator, Revision 142D

1303-4.16, Emergency Power System, Revision 135A

C-11-1-862-5360-002, EDG loading and Fuel, Revision 9

ER-TM-390-1001, Control Room Habitability Program Implementation, Revision 4

MA-TM-716-2301004, Guideline for Implementation and Management of the TMI Lubrication Program, Revision 2

OP-TM-411-211, IST of MS-V-2A and MS-V-2B, Revision 003

#### Drawings

208616, 302275, 302277, 302308

302847, Control Building Chilled Water, Revision 22

302850, Control Building HVAC Pneumatic control Comp. Air Syst. And Typ. Press. Red. Stations, Revision 8

#### Miscellaneous

Instrument Air Recovery Plan, dated September 15, 2015

AR: A2386532

IR: 2549579

### **Section 1R05: Fire Protection**

#### Procedures

1038, Administrative Controls-Fire Protection Program, Revision 76

OP-MA-201-007, Fire Protection System Impairment Control, Revision 6

#### Miscellaneous

CC-AA-309-101, Engineering Technical Evaluations, Revision 11

WOs: C2033420      C2033672

### **Section 1R06: Flood Protection Measures**

#### Procedures

ER-AA-310-1001, Maintenance Rule – Scoping, Revision 4

OP-TM-LWDS-0205, LWDS 2-5, Revision 0A

Miscellaneous

IR 1198202-02, Evaluation of Circ Water System Failure in Turbine Building, Revision 0  
 Information Notice 2005-30, Safe Shutdown Potentially Challenged by Unanalyzed Internal  
 Flooding Events and Inadequate Design, November 7, 2005  
 Letter from US Atomic Energy Commission, Circulating Water Expansion Joint Failure,  
 September 25, 1972  
 Letter from Metropolitan Edison Company, Three Mile Island Units 1 and 2 Circulating Water  
 Expansion Joint Failure, November 10, 1972  
 Letter from MPR Associates Inc, Review of Internal Flooding Licensing and Design Bases for  
 TMI Unit 1, May 6, 2009  
 Regulatory Guide 1.102, Flood Protection for Nuclear Power Plants, Revision 1  
 TMI-PRA-012, Internal Flood Evaluation Summary Notebook, Revision 1

IRs:	2547232	2563298	2544387	817422	2550707	1586151
	881153	2530561	1200165	1200158	1201424	1198202
	1198507	1200162				

**Section 1R08: Inservice Inspection Activities**

Miscellaneous

TMI-1 Steam Generator Inspection Strategy, dated July 1, 2015

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

Procedures

1102-4, Power Operation, Revision 128A  
 OP-AA-1, Conduct of Operations, Revision 1  
 OP-AP-300-1003, Power Reactivity Maneuver, Revision 7  
 OP-TM-AOP-50, Reactor Coolant Leakage, Revision 4  
 OP-TM-AOP-62, Inoperable Rod, Revision 5  
 OP-TM-EOP-001, Reactor Trip, Revision 12  
 OP-TM-EOP-002, Loss of 25°f Subcooling Margin, Revision 9  
 OP-TM-EOP-003, Excessive Primary To Secondary Heat Transfer, Revision 9  
 OP-TM-EOP-006, LOCA Cooldown, Revision 12

**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

Miscellaneous

Maintenance Rule Meeting Minutes #15-09, September 11, 2015

ARs:	A2361219	A2366895	A2376972	A2337307		
IRs:	2531458	1693275	2405270	2478987	2408022	2533520
WOs:	R2082979	C2032729				

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

Procedures

1082.1, TMI Risk Management Program, Revision 8  
AD-AA-3000, Nuclear Risk Management Process, Revision 1  
OP-TM-214-000, Building Spray Systems, Revision 11  
OP-TM-999-097, Manual Actuation of 'B' ES Components during Relay Replacement,  
Revision 0  
OP-AA-108-117, Protected Equipment Program, Revision 4  
OP-AA-108-104, Technical Specification Compliance, Revision 1  
WC-AA-101, On-Line Work Control Process, Revision 18  
WC-AA-104, Integrated Risk Management, Revision Management

Drawings

C2033984

Miscellaneous

Station Risk plan Week of September 21, 2015  
IRs: 2545751 2545737 2528682

**Section 1R15: Operability Evaluations**

Procedures

OP-AA-102-103, Operator Work-Around Program, Revision 4  
OP-AA-102-103-1001, Operator Burden and Plant Significant Decisions Impact Assessment  
Program, Revision 6  
OP-AA-108-115, Operability Determinations, Revision 10  
OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability  
Determinations, Revision 2

Miscellaneous

IRs: 2503797 1656840 1656841  
WOs: C2031230 R2229572 C2030055

**Section 1R18: Plant Modifications**

Miscellaneous

CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 20  
CC-AA-103, Configuration Change Control, Revision 21  
WO R2255301

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

Procedures

1104-19, Control Building Ventilation System, Revision 83  
1303-4.16, EG-Y-1B Monthly Test, Revision 136  
1303-5.2A, Emergency Loading Sequence and HPI Logic Channel/Components, Revision 5  
1303-5.2B, Emergency Loading Sequence and HPI Logic Channel/Components, Revision 5  
E-108.1A, Periodic Inspection and Test of AH-C-4A, Revision 0  
MA-AA-716-011, Work Execution and Closeout, Revision 19  
MA-AA-716-012, Post Maintenance Testing, Revision 20

Miscellaneous

ECR-13-00039

ECR-12-00471

CLR: 15500896

IRs: 2555565 2550407

WO C2034942, Replace EG-Y-1B Ring Catcher Gasket, dated September 8, 2015

**Section 1R22: Surveillance Testing**

Procedures

1302-1.1, Power Range Calibration, Revision 60

1303-4.1C, RPS Channel C Test, Revision 22

1303-4.16, Emergency Power System, Revision 136

1303-13.4, Remote Shutdown Functional Test of EDG-Y-1B Output Breaker, Revision 011

1410-T-1, Tank Inspections, Revision 22

1430-RPS-6C, RPS High Flux Trip Setpoint-Channel C, Revision 4

OP-TM-732-401, Rack out 4160V ES Breaker, Revision 004

WC-TM-430, Surveillance Testing Program, Revision 0

WC-TM-430-1001, Surveillance Testing Program Database Interface and Maintenance,  
Revision 1

Drawings

32835F, Reactor Protection System, Revision 4

D-8012455, Subassembly 'A' Power Range Detailed Diagram, Revision H

D-8012450, Subassembly 'A' Power Range Detailed Diagram, Revision K

Miscellaneous

CLR: 15500306

IRs: 2538324 2557210 1683892 2531452

WOs: R2226832 R2179025 R2242578

**Section 1EP6: Drill Evaluation**

Procedures

EP-AA-1009, Emergency Action Levels for Three Mile Island (TMI) Station

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 F

OP-TM-AOP-050, Reactor Coolant Leakage, Revision 4

Miscellaneous

IRs: 2533839 2534194 2534178 2534522 2534773

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

Procedures

RP-AA-300, Radiological Survey Program, Revision 12

RP-AA-376, Radiological Postings, Labeling, and Marking, Revision 8

RP-AA-376-1001, Radiological Postings, Labeling, and Standard, Revision 12

RP-AA-460, Controls for High and Locked High Radiation Areas, Revision 26

RP-AA-500, Radioactive Material (RAM) Control, Revision 17

RP-AA-503, Unconditional Release Survey Method, Revision 9

Surveys

Survey #	Date	Time	Area
TMI-M-20150824-6	8/24/2015	0930	Reactor Building 308'
TMI-M-20150824-5	8/24/2015	1000	Reactor Building 279'
TMI-M-20150619-3	6/19/2015	0119	Heat Exchanger Vault
TMI-M-20150716-16	7/16/2015	2201	Heat Exchanger Vault
TMI-M-20150811-18	8/11/2015	2313	281' AUX/FH Main Halls – Weekly
TMI-M-20150803-19	8/3/2015	2322	305' AUX Main Hallways – Weekly
TMI-M-20150811-2	8/11/2015	0234	305' AUX Main Hallways – Weekly
TMI-M-20150405-4	4/5/2015	0145	Chem Add Room
TMI-M-20150708-3	7/8/2015	0027	Chem Add Room
TMI-M-20150708-7	7/8/2015	0242	Spent Fuel Pool
TMI-M-20150807-1	8/7/2015	0110	Spent Fuel Pool
TMI-M-20150418-26	4/18/2015	2230	Misc. Waste Evaporator
TMI-M-20150721-7	7/21/2015	1715	Misc. Waste Evaporator WDL-V-75
TMI-M-20150727-4	7/27/2015	0116	Misc. Waste Evaporator Steam Trap B/D
TMI-M-20150731-6	7/31/2015	1519	Misc. Waste Evaporator Release South Walkway
TMI-M-20150820-10	8/20/2015	2320	Misc. Waste Evaporator Support Maint Mech

IRs:	02433742	02438360	02441079	02450481	02459528	02471086
	02506016	02514216	02516047	02547681	02547702	

**Section 2RS2: Occupational ALARA Planning and Control**Procedures

RP-AA-400, ALARA Program, Revision 12  
 RP-AA-400-1001, Establishing Collective Radiation Exposure Annual Business Plan Goals, Revision 4  
 RP-AA-400-1003, Work Group Radiological Excellence Plans, Revision 2  
 RP-AA-400-1004, Emergent Dose Control and Authorization, Revision 7  
 RP-AA-401, Operational ALARA Planning and Controls, Revision 19  
 RP-AA-402, Radiation Protection Dose Excellence Planning Process, Revision 4

Other Documents

TMI Annual Review of the Bioassay Program, 2014  
 TMI Dose Information 2014, dated 1/28/2015  
 Three Mile Island Nuclear Generating, Station 2015 – 2019, Exposure Reduction Plan, Revision 0, dated 3/27/2015

**Section 2RS4: Occupational Dose Assessment**Other Documents

National Voluntary Laboratory Accreditation Program (NVLAP) for TMI dosimetry vendor for 2015

**Section 2RS7: Radiological Environmental Monitoring Program**Procedures

EN-TM-408-4160, RGPP Reference Material for Three Mile Island, Revision 3  
 EN-AA-408-4000, Radiological Groundwater Program Implementation, Revision 5  
 EN-AA-408, Radiological Groundwater Protection Program, Revision 0

Normandeau Associates Procedures:

ER-TMI-02, Collection of Field Dosimeters for Radiological Analysis, Revision 3  
 ER-TMI-09, Annual Land Use Census, Revision 1  
 TMINs 2014 Land Use Census, Normandeau Project No. 20576.009  
 Murray & Trettal, Inc. Monthly Report on the Meteorological Monitoring Program, April 2015  
 Murray & Trettal, Inc. Monthly Report on the Meteorological Monitoring Program,  
 December 2014

Miscellaneous

2014 Radiological Environmental Monitoring Program Report, Three Mile Island Nuclear  
 Generating Station Unit 1 and Unit 2  
 2013 Radiological Environmental Monitoring Program Report, Three Mile Island Nuclear  
 Generating Station Unit 1 and Unit 2  
 Normandeau Associates, Inc. Air Particulate Monitoring System Component Change Report  
 Teledyne Brown Engineering Environmental Services Knoxville Laboratory Annual 2014 Quality  
 Assurance Report  
 NOSA-TMI-14-04, Chemistry, Radwaste, Effluents and Environmental Monitoring Audit Report

IRs: 02436999	02437599	02438499	02438974	02442773	02450190
02451264	02452235	02453924	02456841	02457022	02459638
02461332	02469710	02478908	02481815	02483699	02494052
02507957	02510466	02510547	02511095	02511956	02458509

**Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation**Procedures

RP-AA-600, Radioactive Material/Waste Shipments, Revision 13  
 RP-AA-600-1001, Exclusive Use and Emergency Response Information, Revision 9  
 RP-AA-600-1002, Highway Route Controlled Quantity/Advanced Notification for  
 Radioactive/Waste Shipments, Revision 5  
 RP-AA-600-1003, Radioactive Waste Shipments to Barnwell and the Defense Consolidation  
 Facility (DCF), Revision 9  
 RP-AA-600-1004, Radioactive Waste Shipments to Energy Solution's Clive Utah Disposal Site  
 Containerized Waste Facility, Revision 11  
 RP-AA-600-1005, Radioactive Material and Non Disposal Site Waste Shipments, Revision 18  
 RP-AA-600-1007, Radioactive Waste Shipments to Energy Solution's Clive Utah Disposal  
 Facility Bulk Waste Facility (BWF), Revision 7  
 RP-AA-600-1008, Radioactive Waste Shipments to Waste Control Specialists (WCS) Disposal  
 Facility, Revision 4  
 RP-AA-600-1010, Use and Operation of WMG Software for Creating Containers, Samples,  
 Waste Streams and Waste Types, Revision 2  
 RP-AA-600-1011, Use and Operation of WMG Software for Gross Gamma Characterization and  
 Generation of Shipping Paperwork, Revision 4

- RP-AA-600-1012, Use and Operation of WMG Software for Direct Sample Characterization and Generation of Shipping Paperwork, Revision 2
- RP-AA-600-1013, Use and Operation of WMG Software RAMSHP, Revision 2
- RP-AA-600-1014, Use and Operation of WMG Software Filter Module, Revision 2
- RP-AA-600-1015, Use and Operation of WMG Software for Outage Service Module, Revision 3
- RP-AA-601, Surveying Radioactive Material Shipments, Revision 17
- RP-AA-602, Packaging of Radioactive Material Shipments, Revision 19
- RP-AA-602-1001, Packaging of Radioactive Material/Waste Shipments, Revision 16
- RP-AA-602-1002, Loading Dry Active Waste and Other Waste Forms for Energy Solutions Waste Acceptance Guide (WAG-501), Revision 0
- RP-AA-603, Inspection and Loading of Radioactive Material Shipments, Revision 9
- RP-AA-605, 10 CFR 61 Program, Revision 6
- RP-TM-605-1005, 10 CFR 61 Waste Stream Sampling, Revision 0
- RW-AA-100, Process Control Program for Radioactive Wastes, Revision 11
- RW-AA-103, Request for Disposal of Radioactive Waste, Revision 0
- RW-AA-104, Radwaste Storage Facility/Waste Container Inspections, Revision 5
- RW-AA-105, Guidelines for Operating an Interim On site Low-Level Radioactive Waste Storage Facility, Revision 8
- RW-AA-120, Radwaste Processing Input Control Program, Revision 2
- RW-AA-1000, Radwaste Monthly Report Guidelines, Revision 6
- RP-AA-600-1006, Shipment of Category 1 Quantities of Radioactive Material or Waste (Category 1 RAMQC), Revision 11
- RP-AA-600-1009, Shipment of Category 2 Quantities of Radioactive Material or Waste (Category 2 RAMQC), Revision 2

Miscellaneous

Quality Assurance:

- Check-In Self-Assessment for AR 02432962, Radwaste
- NOSA-TMI-14-04, Chemistry, Radwaste, Effluent and Environmental Monitoring Audit Report
- NOSA-TMI-15-06, Radiation Protection Audit Report

Scaling Factors:

- Part 61 Analysis for secondary Powdex Resin Waste Stream
- Quarterly Trending Reports for Shifts in Scaling Factors, 3rd Quarter 2013 – 2nd Quarter 2015
- TMI Unit 1 DAW Waste Stream Update

Lesson Plans:

- HAZSEC, DOT Security Awareness and Transportation Security Plan, Revision 1
- NRWSHP-1000, DOT/79-19 Training for Support of Radioactive & Asbestos Shipments, Revision 003

Shipments:

- RS-14-152; RS-14-168; RS-15-030; RS-15-075; RS-15-078

IRs:	1575849	1585715	1629751	1658882	2384661	2439065
	2485344	2504837				

**Section 40A1: Performance Indicator Verification**Miscellaneous

LER 2013-001-01, Reactor Coolant 'B' Cold Leg Drain Line Flaw

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

LER 2014-002-00, Through-wall Leak on High Pressure Injection (HPI) 'A' Train Root Valve

MU-V-1034 Socket Weld

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

MA-AA-716-004, Conduct of Troubleshooting, Revision 13

OP-TM-622-201, Control Rod Movement, Revision 8

OP-TM-641-000, Reactor of Protection System, Revision 002

OP-TM-AOP-062, Inoperable Rod, Revision 5

Miscellaneous

ACMP-ODM-TMI-1-2015-0782

ECR 12-00471

ECR 13-00039

ARs: 2321778

IRs: 2254267      2527738

**LIST OF ACRONYMS**

1RFO20	TMI, 20 <sup>th</sup> refueling outage
1RFO21	TMI, 21 <sup>st</sup> refueling outage
ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As is Reasonably Achievable
CFR	Code of Federal Regulations
EDG	Emergency Diesel Generator
ESAS	Engineered Safeguards Actuation System
HRA	High Radiation Area
IMC	Inspection Manual chapter
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
ODCM	Off-site Dose Calculation Manual
PI	Performance Indicator
PCP	Process Control Program
REMP	Radiological Environmental Monitoring Program
RG	Regulatory Guides
SG	Steam Generator (Once-Through)
SRPS	Single Rod Power Supply
SSC	Structure, System, and Component
TMI	Three Mile Island Unit 1
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VHRA	Very High Radiation Area