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

February 11, 2013

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

SUBJECT: THREE MILE ISLAND STATION – NRC INTEGRATED INSPECTION REPORT 050000289/2012005

Dear Mr. Pacilio:

On December 31, 2012, 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 January 25, 2013, with Mr. Mark Newcomer, TMI Plant Manager, and other members of your staff.

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

This report documents one NRC-identified apparent violation (AV) concerning missing flood seals in conduits located in the air intake tunnel that lead to the auxiliary building. This violation has potential safety significance greater than very low safety significance (Green). However, the violation does not represent an immediate safety concern because flood seals were permanently installed upstream of the missing seals in November 2012. This violation, with the supporting circumstances and details, is documented in the inspection report.

This report also documents two NRC-identified findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance, and because they are entered into your corrective action program, the NRC is treating these findings as NCVs, consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U. S. Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Three Mile Island. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of

the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Three Mile Island.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We appreciate your cooperation. Please contact me at 610-337-5046 if you have any questions regarding this letter.

Sincerely,

/RA/

Gordon K. Hunegs, Chief
Projects Branch 6
Division of Reactor Projects

Docket No: 50-289
License No: DPR-50

Enclosure: Inspection Report 05000289/2012005
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Three Mile Island.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We appreciate your cooperation. Please contact me at 610-337-5046 if you have any questions regarding this letter.

Sincerely,

/RA/
Gordon K. Hunegs, Chief
Projects Branch 6
Division of Reactor Projects

Docket No: 50-289
License No: DPR-50

Enclosure: Inspection Report 05000289/2012005
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

Distribution w/encl:
W. Dean, RA
D. Lew, DRA
D. Roberts, DRP
P. Wilson, DRP
C. Miller, DRS
J. Clifford, DRS
G. Hunegs, DRP
S. Barber, DRP
E. Miller, NRR
C. Gratton, NRR
N. Lafferty, DRP
A. Dugandzic, DRP
D. Werkheiser, DRP, SRI
J. Heinly, DRP, RI
J. Cassidy, RI OEDO
RidsNrrPMThreeMileIsland Resource
RidsNrrDorlLpl1-2 Resource
ROPReportsResource

DOC NAME: G:\DRP\BRANCH6\+++THREE MILE ISLAND\TMI INSPECTION REPORTS\
TMI_REPORT_IR2012-005 FINAL.DOCX
ADAMS Accession No.: **ML13042A277**

☑ **SUNSI Review**		☑ **Non-Sensitive** ☐ Sensitive		☑ **Publicly Available** ☐ Non-Publicly Available	
OFFICE *mmt*	RI/DRP	RI/DRP	RI/DRP		
NAME	DWerkheiser/GKH for	SBarber/ GKH for	GHunegs/GKH		
DATE	02/08 /13	02/08 /13	0208 /13		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

Docket No:	50-289
License No:	DPR-50
Report No:	05000289/2012005
Licensee:	Exelon Generation Company
Facility:	Three Mile Island Station, Unit 1
Location:	Middletown, PA 17057
Dates:	October 1 through December 31, 2012
Inspectors:	D. Werkheiser, Senior Resident Inspector J. Heinly, Resident Inspector C. Cahill, Senior Reactor Analyst S. Galbreath, Reactor Engineer D. Kern, Senior Reactor Inspector J. Laughlin, Emergency Preparedness Inspector, NSIR T. Moslak, Senior Health Physicist J. Richmond, Senior Reactor Inspector
Approved by:	G. Hunegs, Chief Reactor Projects Branch 6 Division of Reactor Projects

TABLE OF CONTENTS

SUMMARY OF FINDINGS

IR 05000289/2012005; 10/01/2012-12/31/2012; Three Mile Island, Unit 1, Integrated Inspection Report; Problem Identification and Resolution, Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns.

The report covered a three-month period of baseline inspection conducted by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified one apparent violation and two findings of very low safety significance (Green), both of which were NCVs. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, “Significance Determination Process” (SDP). The cross-cutting aspects for the findings were determined using IMC 0310, “Components Within Cross-Cutting Areas.” Findings for which the SDP does not apply may be Green, or be assigned a severity level after NRC management review. The NRC’s program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, “Reactor Oversight Process,” Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation (NCV) of General Design Criterion 2, "Performance Standards," because Exelon had not established measures to ensure that the seismic gap flood seal was adequate to remain watertight during a probable maximum flood (PMF) event, as required by the TMI design. Specifically, the design requirement for the seismic gap seal specified that it was to be watertight. However, the installed seal configuration had measurable leakage when tested. The inspectors determined that the failure to construct, maintain, and inspect the seismic gap flood seal consistent with its design (e.g., watertight) was a performance deficiency within Exelon's ability to foresee and prevent. Exelon entered this issue into their corrective action program, took appropriate interim corrective actions, and completed permanent modifications to restore the watertight function of the seismic gap barrier.

  This finding was more than minor because it was similar to the more than minor example 3.j in Inspection Manual Chapter (IMC) 0612 Appendix E, "Examples of Minor Issues," in that the seal's as-built and maintained configuration resulted in a condition where there was reasonable doubt regarding the functionality of the seismic gap seal to remain watertight during a PMF event. Also, this finding was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," the inspectors performed a bounding risk evaluation using an unavailability period of greater than one year for the watertight seal, and determined this finding was of very low safety significance (Green). This finding has a cross-cutting aspect, as described in IMC 0310, in the area of Human Performance, Decision Making, because Exelon failed to verify the validity of underlying assumptions or continued functionality of the seismic gap flood seal following an external flood re-analysis which revised the design basis PMF conditions. [H.1(b)] (Section 4OA2.6)

- Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, in that Exelon failed to identify and correct conditions adverse to quality regarding the licensing basis external flood barrier integrity. Specifically,

Exelon failed to identify and correct 13 unsealed penetrations through the Intake Screen and Pump House (ISPH) flood barrier and multiple deficiencies that challenged the fulfillment of ISPH support equipment capability to maintain the integrity of the licensing basis flood barrier. The deficiencies were entered into the corrective action program and permanent corrective actions were taken to seal the penetrations to restore the external flood barrier integrity and restoration of the support equipment capability for flood protection.

The finding was more than minor because it is associated with the protection against external factors attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon did not identify and correct 13 unsealed penetrations in a licensing basis external flood barrier and its associated support equipment deficiencies such that the barrier is fully capable of maintaining the ISPH free of flood water. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, Exhibit 2 – Mitigating Systems Screening Questions and Exhibit 4 – External Events Screening Questions and determined that a detailed risk evaluation was required based upon the assumed complete failure of the flood barrier would degrade two trains of Decay Heat Removal. A detailed risk evaluation modeled in SAPHIRE 8 using the TMI SPAR model version 8.18 determined the finding to be of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to identify the unsealed penetrations through the flood barrier and multiple deficiencies in supporting equipment in a timely manner commensurate with its safety significance. [P.1(a)] (Section 4OA5.2.b.1)

- TBD. The inspectors identified an apparent violation (AV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, was identified during the TI-187 flooding walkdowns for Exelon's failure to identify and correct an external flood barrier deficiency. Specifically, Exelon failed to identify and correct, during external flood barrier walkdowns, that electrical cable conduits were not flood sealed in the Air Intake Tunnel (AIT), as designed, to maintain the integrity of the external flood barrier. The deficiency was entered into Exelon's corrective action process and permanent corrective actions were taken to seal the electrical conduits and restore the external flood barrier integrity.

  The finding was determined to be more than minor because it is associated with the protection against external factors attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon failed, during multiple focused walkdowns, to identify the degraded external flood barrier in the Crouse-Hinds couplings in the AIT that challenged the external flood barrier operability. The significance of the degraded external flood barrier is to be determined and cannot accurately be calculated until additional testing and analysis of the as-found configuration is complete. Specifically, Exelon is performing additional testing on the capability of as-found foam fire sealant material, present in the conduits at the AIT/Aux Building interface, to mitigate flood water entry into the safety-related structures. These results will be an input into the licensee's flood mitigation aggregate impact review. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to review the external flood barrier with a low threshold for identifying issues which resulted in the failure to identify the unsealed electrical conduits in the AIT in a timely manner commensurate with its safety significance. [P.1(a)] [Section 4OA5.2.b.2]

REPORT DETAILS

Summary of Plant Status

Three Mile Island, Unit 1 (TMI) began the inspection period at approximately 100 percent rated thermal power. On December 8, 2012, TMI reduced power to 90 percent for turbine valve testing and returned to 100 percent on December 9, 2012 and continued to operate at full rated thermal power for the rest of the inspection period.

1. REACTOR SAFETY [R]

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 Readiness for Seasonal Extreme Weather Conditions – Cold Weather Preparation

a. Inspection Scope

The inspectors walked down risk significant plant areas during the week of October 8 to assess Exelon's preparation and protection for cold weather conditions. Focused inspections were conducted on the borated water storage tank and heat trace system health to ensure availability of associated systems during cold weather conditions. In addition, the inspectors reviewed the work maintenance backlog for the heat trace system and the scheduled corrective maintenance dates. The inspectors reviewed and observed the implementation of procedure WC-AA-107, Seasonal Readiness, Rev. 10. Specifically, the inspectors observed winter weather readiness meetings to ensure adequate attention was provided to potential cold weather impacts on safety equipment commensurate with its safety significance.

b. Findings

No findings were identified.

.2 Readiness for Seasonal Extreme Weather Conditions – Hurricane Sandy

a. Inspection Scope

On October 29 and 30, 2012, the inspectors performed an inspection of the site preparations for Hurricane Sandy and the resultant wind and rain impact. The inspectors reviewed abnormal operating procedures, interviewed operators, and performed extensive plant walk downs to confirm the adequacy of the licensee's risk mitigation actions in preparation for the storm. In addition, the inspectors independently reviewed the planned and emergent work activities scheduled during the storm to ensure the availability and reliability of safety equipment. The resident inspectors maintained site coverage during the storm and continually monitored plant and weather conditions to ensure abnormal conditions and deficiencies were promptly identified and appropriately addressed commensurate with their safety significance.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

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

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- NR-P-1B planned outage on October 24, 2012
- 'A' decay closed cooling water system after planned outage on December 14, 2012
- MS-V-2 lineup during testing on December 26, 2012
- Reactor building emergency coolers during surveillance testing on December 28, 2012

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, technical specifications, work orders, condition 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 November 15, 2012, the inspectors performed a complete system walkdown of accessible portions of the spent fuel pool cooling system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, 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 performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. 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

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

a. Inspection Scope

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

- Station blackout diesel area, SBO-FA-1, on October 15, 2012
- 'B' Emergency diesel generator area, DG-FA-2, on October 25, 2012
- Make-up Valve Alley in auxiliary building, AB-FZ-3, on November 27, 2012
- 'A' decay heat vault in auxiliary building, AB-FA-1, on December 06, 2012
- General area elevation 305' auxiliary building, AB-FZ-9, on December 28, 2012

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on October 5, 2012, that involved a fire in the Intermediate Building at the 'A' air compressor, near the motor-driven emergency feedwater pumps. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that Exelon personnel identified deficiencies, openly discussed them in a self-critical manner at the debrief, and took appropriate corrective actions as required. The inspectors evaluated specific attributes as follows:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques
- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas

- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Exelon's fire-fighting strategies.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the station blackout diesel fire service heat exchanger inspection performed under M-164, Station Blackout (SBO) Diesel Generator Major Inspection (Mechanical), Revision 18, to determine its readiness and availability to perform its credited functions. The inspectors reviewed the design basis for the component and verified Exelon's commitments to NRC Generic Letter 89-13. The inspectors reviewed the results of previous inspections of the SBO diesel generator. The inspectors discussed the results of the most recent inspection with engineering staff and field technicians and reviewed pictures of the as-found and as-left conditions. The inspectors verified that Exelon initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11 – 2 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on October 23, 2012. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed the control room operators support of fire service pump (FS-P-1) troubleshooting efforts as well as routine plant operations on December 12, 2012. Also, on December 13, the inspectors observed the control room operators perform the 'B' emergency diesel generator monthly surveillance. The inspectors observed licensed operator 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 licensee supervision and management were adequately engaged in plant operations and appropriately assessed control room operator performance.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

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

- Pressurizer a(1) determination for heater bundle leakage on December 17, 2012
- 'A' emergency feedwater pump (EF-P-1) vibration functional assessment on December 31, 2012

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 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 60.65(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.

- Yellow station risk during 'A' emergency diesel generator vibration monitoring on October 02, 2012
- Planned station blackout diesel outage on October 18, 2012
- Workweek 1243 activities planned and adjusted during hurricane Sandy on October 29-30, 2012
- MU-P-1B removed from service and associated Yellow station risk for planned system outage on November 12-13, 2012

a. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15 – 3 samples)

a. Inspection Scope

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

- Review of emergency diesel generator fuel pumps with respect to 10CFR21 review documented in IR 1421493 on October 01, 2012
- Unexpected flood barrier hydrostatic capability test results documented in IR 1428726 on October 19, 2012
- Station blackout diesel specific gravity battery inspection issue and damper failure as documented in IRs 1429564 and 1432623 on November 9, 2012

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to

Exelon's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (71111.19 – 3 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.

- 1302-5.31D, 4160V 1E Bus Loss of Voltage/Degraded Grid Timing Relay Calibration and Logic Check, after replacing undervoltage agastat relays on October 12, 2012
- 1107-9, SBO Diesel Generator, after SBO system outage that occurred on October 14-22, 2012
- 1303-5.2B, 'B' Emergency Loading Sequence and HPI Logic Channel / Component Test, Rev. 009, after replacing sequence logic relay on November 30, 2012

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 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:

- 1302-5.18, HPI/LPI Flow Channel Calibration on October 3 and 5, 2012
- MA-TM-125-031, SBO Battery Load Test on October 15, 2012

- OP-TM-214-201, IST of BS-P-1A on November 5-6, 2012 (in-service test)
- Review of Surveillance Frequency Control Program on December 13-14, 2012

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

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

a. Inspection Scope

The NRC nuclear security and incident response headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures (EPIPs) and the Emergency Plan located under ADAMS accession number ML12192A512 as listed in the Attachment.

The licensee determined that in accordance with 10 CFR 50.54(q), the changes made in the revisions resulted in no reduction in the effectiveness of the Plan, and that the revised Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The NRC review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection. The specific documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 - 1 sample)

.1 Drill Evaluation

a. Inspection Scope

The inspectors evaluated the conduct of a routine TMI emergency drill on October 23, 2012 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 inspectors' observations with those identified by Exelon staff in order to evaluate Exelon's critique and to verify whether Exelon staff was properly identifying weaknesses and entering them into the corrective action program.

b. Findings

No findings were identified.

2. RADIATION SAFETY [RS]

Cornerstone: Occupational Radiation Safety

2RS01 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)

a. Inspection Scope

During the period December 10 - 14, 2012, the inspector conducted the following activities to verify that the licensee was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas, and other radiological controlled areas. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, relevant TS, and the licensee's procedures.

Plant Walkdown and Radiation Work Permits (RWP) Reviews

The inspector toured accessible radiological controlled areas in the auxiliary building, fuel handling building, and primary chemistry laboratory to verify the proper implementation of radiological controls. Radiation survey maps were reviewed of selected areas to identify radiological conditions, and the adequacy of postings.

The inspector identified tasks performed in the radiological controlled areas (RCAs). The inspector reviewed the applicable RWPs, and the electronic dosimeter dose/dose rate alarm setpoints for the associated tasks, to determine if the radiological controls were acceptable and if the setpoints were consistent with plant policy. Jobs reviewed included sampling of a waste gas decay tank and performing a walkdown of effluent monitoring instrumentation and ventilation filtration systems located in the RCA.

The inspector evaluated the effectiveness of radiological controls by reviewing electronic dosimeter alarm reports, personnel contamination event reports (and related issue reports), and observing practices at various locations.

Problem Identification and Resolution

The inspectors evaluated the licensee's program for assuring that access controls to radiological significant areas were effective and properly implemented by reviewing electronic dosimeter alarm reports, personnel contamination event reports, and relevant issue reports. The inspector determined that problems were identified in a timely manner, that an extent of condition and cause evaluation were performed when appropriate, and corrective actions were appropriate to preclude repetitive problems.

b. Findings

No findings were identified.

Cornerstone: Public Radiation Safety

2RS06 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

During the period December 10 - 14, 2012, the inspector conducted the following activities to ensure the gaseous and liquid effluent processing systems are maintained so that radiological discharges are properly reduced, monitored, and evaluated, and to verify the accuracy of effluent releases and public dose calculations resulting from radioactive effluent discharges.

The inspector used the requirements in 10 CFR Part 20, 10 CFR 50 Appendix I, 10 CFR 50.75(g), applicable Industry standards, and licensee procedures, required by the site Offsite Dose Calculation Manual (ODCM), as criteria for determining compliance.

a. Inspection Scope

Event Report and Effluent Report Reviews

The inspector reviewed the TMI annual radiological effluent release reports for 2010 and 2011. The inspector reviewed sampling results, and trends identified by the licensee. The inspector determined if these releases were evaluated, and any abnormal releases were entered in the corrective action program and were adequately resolved.

ODCM and Updated Final Safety Analysis Report Review

The inspector reviewed the TMI Updated Final Safety Analysis Report (UFSAR) descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths to identify system design features and required functions.

The inspector reviewed changes to the TMI ODCM made by the licensee since the last inspection. The inspector reviewed the evaluations of the changes and determined that they were technically justified and maintained effluent releases as low as is reasonably achievable (ALARA).

Groundwater Protection Initiative (GPI) Program

The inspector reviewed reported groundwater monitoring sample results and changes to the licensee's written program for identifying, controlling, and remediating contaminated spills/leaks to groundwater. The inspector observed a monthly groundwater sample being taken from MW-20. An in-depth inspection of the GPI was performed in accordance with Temporary Instruction (TI) 2515/185 and documented in Section 4OA5 of this report.

Procedures, Special Reports, and Other Documents

The inspector reviewed issue reports related to the effluent program issued since the previous inspection to identify any additional focus areas for the inspection based on the scope of problems described in these reports.

The inspector reviewed effluent program implementing procedures, including those associated with effluent sampling, effluent monitor setpoint determinations, and dose calculations.

The inspector reviewed copies of licensee assessment reports of the effluent monitoring program since the last inspection to gather insights into the effectiveness of the licensee's program.

Walkdowns and Observations

The inspector walked down selected components of the gaseous and liquid discharge systems, with the responsible system engineers, to verify that equipment configuration and flow paths align with the descriptions in the TMI UFSAR and to assess equipment material condition. The inspector reviewed the calibration records for each of the radiation monitors examined. During the walkdown, special attention was made to identify potential unmonitored release points, building alterations which could impact airborne, or liquid effluent controls, and ventilation system leakage that communicate directly with the environment.

Monitoring equipment inspected included the following:

Gaseous Discharge Monitors:

- Auxiliary Building/Fuel Handling and Reactor Building Purge exhaust radiation monitors, RM-A-8 and RM-A-9, respectively;
- Waste Gas Disposal Effluent monitor, RM-A-7;
- Fuel Handling ESF Ventilation monitor, RM-A-14;
- Condenser Offgas monitors, RM-A -5 and RM-A-15.

Liquid Discharge Monitors:

- Liquid Radioactive Waste Discharge monitor, RM-L-6;
- Plant Water Discharge monitor, RM-L-7;
- Industrial Water Treatment System monitor, RM-L-12;

The inspector walked down filtered ventilation systems, with the system engineers, to verify there were no degraded conditions associated with high-efficiency particulate air (HEPA)/charcoal banks, improper alignment, or system degradation issues that would impact the performance, or the effluent monitoring capability.

The inspector reviewed the licensee's surveillance test records for air cleaning equipment (i.e., fans, charcoal filters, and HEPA filters for the Unit 1 plant ventilation systems) to assure that the equipment met the TS operability criteria.

The inspector determined that the licensee had not made any changes to their effluent release paths.

Sampling and Analyses

The inspector observed technicians obtaining weekly tritium, particulate, iodine, and noble gas samples from the auxiliary building/fuel handling building and reactor purge system radiation monitors, RM-A-8 and RM-A-9, respectively. Subsequently, the inspector reviewed the analytical results for these samples.

The inspector observed a technician obtain gas samples from the B-waste decay tank, prepare a discharge permit (G-2012-12028), and verify that the procedural requirements were met.

The inspector reviewed the calibration records and daily quality control checks for the gamma spectroscopy detectors (Nos. 1, 2, 3, 4) and for the two beta scintillation counters to verify that the instruments operated within the established parameters and achieved the required lower limit of detectability.

The inspector reviewed the results of the inter-laboratory and intra-laboratory comparison (cross check) programs to verify the quality of the radioactive effluent sample analyses. The inspector also determined that the intra and inter-laboratory comparison program includes hard-to-detect isotopes.

The inspector reviewed liquid and gaseous discharge permits for routine processing and discharging waste streams. The inspector verified that appropriate effluent treatment equipment was being used and that radioactive liquid and gaseous waste is being analyzed, processed, and discharged in accordance with licensee procedures.

Instrumentation and Equipment: Effluent Flow Measuring Instruments

The inspector reviewed the methodology that the licensee uses to determine the effluent stack and ventilation system flow rates to verify that the flow rates are consistent with TSs/ODCM and FSAR values.

Instrumentation and Equipment: Air Cleaning Systems

The inspector determined that surveillance test results for the HEPA and charcoal filters installed in the auxiliary building, fuel handling building, and reactor purge system met TS/ODCM acceptance criteria.

Dose Calculations

The inspector reviewed five radioactive gaseous and three liquid waste discharge permits to verify that the projected doses to members of the public were accurate and based on representative samples from the discharge path.

The inspector evaluated the methods used to determine the isotopes that are included in the source term to ensure all applicable radionuclides are included, within detectability standards. The review included the licensee's current waste stream analyses to ensure hard-to-detect radionuclides are included in the effluent releases.

The inspector reviewed the licensee's methodology for offsite dose calculations to verify compliance with the ODCM and RG 1.109. The inspector reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to ensure appropriate dispersion/deposition factors are being used for public dose calculations.

The inspector reviewed the latest Land Use Census to verify that changes in the local land use have been factored into the dose calculations and environmental sampling/analysis program.

The inspector determined that the calculated doses are within the 10 CFR 50, Appendix I, and ODCM dose criteria. The inspector determined that the licensee was tracking cumulative doses on a monthly, quarterly, and annual basis, and comparing dose to the regulatory criteria.

Problem Identification and Resolution

Inspector assessed whether problems associated with the effluent monitoring and control program are being identified by the licensee at an appropriate threshold and are properly addressed for resolution in the licensee's corrective action program. In addition, the inspector evaluated the effectiveness of the corrective actions for a selected sample of problems documented by the licensee.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification (71151)

Occupational Exposure Control Effectiveness (1 sample)

a. Inspection Scope

The inspector reviewed implementation of the licensee's Occupational Exposure Control Effectiveness Performance Indicator (PI) Program. Specifically, the inspector reviewed electronic dosimeter dose and dose rate alarm reports, issue reports, and associated documents, for occurrences involving locked high radiation areas, very high radiation areas, and unplanned exposures occurring during the past four (4) calendar quarters.

Data contained in these records was reviewed against the criteria specified in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, to verify that all occurrences that met the NEI criteria were identified and reported as performance indicators.

b. Findings

No findings were identified.

RETS/ODCM Radiological Effluent Occurrences (1 sample)

a. Inspection Scope

The inspector reviewed relevant effluent release reports and associated dose assessments for the period October, 2011 through November, 2012, for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences that exceed 1.5 mrem/qtr whole body or 5.0 mrem/qtr organ dose for liquid effluents; and 5 mrads/qtr gamma air dose, 10 mrad/qtr beta air dose, and 7.5 mrads/qtr for organ dose for gaseous effluents. This inspection activity represents the completion of one (1) sample relative to this inspection area; completing the annual inspection requirements.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152 – 3 annual samples)

.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 – Multiple Spurious Operation (MSO) Mitigation (1 sample)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's implementation of NEI 00-01 revision 2 at TMI, guidance for post-fire safe shutdown circuit analysis. The inspectors verified that Exelon followed the guidance to identify fire safe shutdown components potentially susceptible to MSO in postulated fire scenarios and appropriately entered the deficiencies into their corrective action program. The inspectors verified that Exelon's actions were appropriately completed within the timeline provided by the enforcement guidance memorandum (EGM) 09-002.

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.

NEI 00-01 provided a methodology for licensees to conduct post-fire safe shutdown circuit analysis involving MSO of components. The NEI guidance provided a generic list of MSO scenarios that licensees would use as the basis for their circuit analysis. Licensees performed this evaluation if they chose not to adopt 10 CFR 50.48(c), NFPA 805. The NEI 00-01 methodology was to be performed in a manner commensurate with its safety significance as outlined in Reg Guide 1.189 Rev. 2 and enforcement guidance memorandum (EGM) 09-002. Specifically, licensees were granted enforcement discretion for the identification and resolution of MSO deficiencies until November 2012.

Exelon chose to perform the NEI 00-01 circuit analysis for TMI. Exelon performed an expert panel review in accordance with NEI 00-01, Rev. 2, guidance in May 2010. The expert panel identified permanent circuit modifications, plant configuration changes, procedure changes and compensatory operator rounds were required to mitigate MSO deficiencies. Subsequently, Exelon entered the deficiencies into the corrective action program and completed the required mitigation actions in accordance with Reg Guide 1.189 and EGM 09-002. The inspectors independently performed field walkdowns to ensure that procedure and plant configuration changes appropriately addressed the MSO deficiencies. In addition, the inspectors verified that the non-licensed operators were adequately trained to perform compensatory actions. The inspectors identified no issues of concern with the MSO mitigation actions.

In the spring of 2012, Exelon identified, through review of NEI 00-01 Rev. 3 and a scope validation review, that additional components were susceptible to MSO and required plant modifications, procedure changes and plant configuration changes. The deficiencies were entered into the corrective action program and Exelon promptly took corrective actions commensurate with EGM 09-002 completion deadlines. Exelon completed the required actions and took compensatory actions to address all of the identified deficiencies except for one wiring modification. Exelon determined that the remaining modification would require the plant in a shutdown condition to complete. The inspectors reviewed the additional deficiencies and associated corrective actions and determined that the licensee's actions addressed the issues and were completed in a manner commensurate with the safety significance. Furthermore, the inspectors validated that an adequate extent of condition review was performed such that reasonable assurance that MSO deficiencies were identified. Specific to the outstanding modification, the inspectors verified that the modification must be worked with the plant shutdown. In addition, the inspectors validated that the modification was scheduled in the next planned refuel outage as well as coded for completion in any forced outage prior to the refueling outage. The inspectors, with consultation with the regional fire protection specialists, assessed the impact of the outstanding MSO deficiency and concluded it was not more than minor due to its low safety significance and minimal impact on post-fire safe shutdown strategy.

.3 Annual Sample: Fire Suppression Spray Nozzle Blockage Operating Experience Evaluation (1 sample)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's evaluation and corrective actions for industry operating experience (OpE) regarding fire suppression (FS) system spray nozzle blockage. Specifically, in October 2010 and September 2011, licensees at

two nuclear power plants identified their FS sprinkler systems were inoperable due to spray nozzles being internally blocked by piping corrosion products. The associated FS branch piping was normally dry; however, due to inadequate pipe slope and drainage small amounts of water from FS system testing or actuation remained in the branch piping. Over a long period of time, repetitive wetting and drying of the FS piping interior surfaces caused significant corrosion. The corrosion products were flushed down the branch pipe and blocked the spray nozzle when the FS system was actuated for testing. The licensees determined the primary cause was inadequate piping design (slope and drainage) and a contributing cause was deficient FS system test procedures which did not ensure all branch lines were periodically flushed. Corporate engineers initiated IR 1275720 to assess applicability of this OpE issue at all Exelon sites including TMI.

The inspectors independently reviewed IR 1275720, selected OpE documents including related licensee event reports, the TMI Unit 1 Updated Final Safety Analysis Report (UFSAR), the TMI Unit 1 Fire Hazards Analysis Report, FS system drawings, selected FS system test records, fire protection system modifications and replacements performed during the last 5 years, and all fire protection system issues entered in the corrective action program database during the last 5 years. Additionally the inspectors interviewed station personnel and performed plant walkdowns to verify the condition of FS spray nozzles and the adequacy of corrective actions including planned visual inspections of FS piping and nozzles. The inspectors reviewed this issue to determine whether TMI staff adequately evaluated issue applicability, identified the root and contributing causes, identified associated lessons learned, implemented appropriate actions in a timely manner, and communicated the results to appropriate staff. The inspectors compared the actions taken to the requirements of Exelon's corrective action program.

b. Findings

No findings were identified.

Site engineers reviewed root cause evaluations of the related OpE events from other power plants and discussed TMI specific actions with the Exelon fleet peer group. Specific actions included FS piping walkdowns and isometric drawing reviews to assess FS piping drainage, FS test procedure and surveillance history reviews, and identifica tion of six sections of FS piping which could be susceptible to similar corrosion and blockage. Site Engineers initiated additional IRs and work orders with appropriate schedules to perform and evaluate internal visual inspections of these six FS piping zones. The inspectors determined engineers thoroughly evaluated the FS spray nozzle blockage issue, understood the primary and contributing causes, established timely and appropriate corrective actions, entered the actions into the corrective action program for implementation, and effectively communicated the results to the TMI organization.

.4 Cumulative Operator-Work-Around (1 sample)

a. Inspection Scope

The inspectors reviewed the cumulative effects of the existing operator work-arounds (OWAs), the list of operator challenges, equipment deficiencies logs, the list of operations department concerns, and the list of open main control room deficiencies and main control room tags to identify any effect on emergency operating procedure

operator actions, and impact on possible initiating events and mitigating systems. The inspectors also interviewed selected operations and engineering personnel to assess their understanding of the OWAs and other listed control room deficiencies. The inspectors observed the quarterly OWA meeting to determine whether station personnel were identifying, assessing, and reviewing OWAs as specified in Exelon administrative procedure OP-AA-102-103, Operator Work-Around Program, Rev. 3.

b. Findings and Observations

No findings were identified.

The inspectors determined that the issues reviewed did not adversely affect the capability of the operators to implement abnormal or emergency operating procedures. The inspectors also verified that Exelon entered operator workarounds and burdens into the corrective action program at an appropriate threshold and planned or implemented corrective actions commensurate with their safety significance.

.5 Semi-Annual Trend Review (1 sample)

a. Inspection Scope

The inspectors performed a semi-annual review of TMI issues, to identify trends that might indicate the existence of more significant safety issues, as required by NRC Inspection Procedure 71152, Identification and Resolution of Problems. The inspectors included in this review repetitive or closely-related issues that may have been documented by Exelon outside of the corrective action program, such as trend reports, performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or corrective action program backlogs. The inspectors also reviewed the Exelon corrective action program database from July 2012 through December 2012, to assess issue reports written in various subject areas (equipment problems, human performance issues, etc.) as well as individual issues identified during the NRCs daily IR review (Section 4OA2.1).

b. Findings

No findings were identified.

The inspectors determined that, corrective actions to address limiting condition for operation (LCO) and fire protection time-clock deficiencies from the first half of 2012 have been effective regarding LCO time-clock entry. However, corrective actions have been marginally effective regarding fire protection in that minor occurrences continue (IR 1450965). In addition an adverse trend was been identified by both the licensee and NRC regarding transient combustible control (e.g. IR 1449500 and 1461029) where materials have been placed and left uncontrolled in transient combustible free zones. The licensee has implemented prompt actions to arrest the trend via station communications, focused plant walkdowns, and improved markings and signage. Exelon continues to evaluate the cause of the trend and is in progress of performing a common and root cause evaluation.

The inspectors evaluated a sample of departments that provide input into the aggregate trend review, which included maintenance, work planning, and operation departments. This review included a sample of issues and events that occurred over the course of the past two quarters to objectively determine whether issues were appropriately considered or ruled as emerging or adverse trends, and in some cases, verified the appropriate disposition of resolved trends. The inspectors verified that these issues were addressed within the scope of the corrective action program, or through department review and documentation in the aggregate trend review had had appropriate action requests in a timely manner.

.6 (Closed) Unresolved Item (URI) 05000289/2011005-03, Adequacy of Seismic Gap Flood Seal

a. Inspection Scope

This URI was identified because additional information was required to determine whether a performance deficiency existed regarding the configuration and qualification of the hydrostatic seal (i.e., flood seal) in the seismic gap between the reactor building and adjacent buildings and structures.

The inspectors performed an in-depth in-office review of Exelon's Technical Evaluation 1170013-06, "Consequences of Inadequate Flood Seal in Reactor Building Seismic Gap." In addition, the inspectors performed on-site observations of field excavation and examination of seismic gap flood seal samples, interviewed design engineers, and reviewed corrective actions associated with the hydrostatic qualification of the seismic gap flood seal to withstand design basis probable maximum flood (PMF) conditions.

b. Findings and Observations

Introduction: The inspectors identified a finding of very low safety significance (Green) involving a non-cited violation of General Design Criterion 2, "Performance Standards," because Exelon had not established measures to ensure that the seismic gap flood seal was adequate to remain watertight during a PMF event, as required by the TMI design. Specifically, the design requirement for the seismic gap seal specified that it was to be watertight. However, the installed seal configuration had measurable leakage when tested.

Description: As a result of the TMI external flood re-analysis, Exelon modified the TMI flood barrier system to accommodate a higher predicted flood height for a PMF event. Engineering Change Request (ECR) TM 11-00426, "Raise Level of External Flood Protection," in part, re-evaluated the adequacy of the seismic gap flood seal capability. ECR Attachment-17, "Reactor Building Elevation 305 feet Seismic Gap Flood Seal Evaluation," described the seismic gap as filled with Dow Corning 3-6548 silicone RTV foam (i.e., a low density fire resistant penetration seal) to a nominal depth of two feet, but conservatively assumed only a gap depth of nine inches for the watertight assessment. In order to evaluate the capability of the existing seal to withstand the higher predicted water pressure, Exelon used a friction coefficient derived from test results for a similar material (i.e., BISCO SF-20 foam). NPB-92, "BISCO Seal Test Equivalency for Use in Conduit Sealing," documented the test results for BISCO SF-20 foam (i.e., a low density fire resistant penetration seal), which had been performed to determine seal blowout resistance, not to verify or test the seal's hydrostatic properties.

The inspectors identified that the NPB-92 test results also documented seal water leakage, but the leakage rates were not quantified or evaluated. Drawing E-107-012, "Architectural Special Area Plans, Sections, & Details," provided the installation and configuration details for the seismic gap seal. The inspectors identified that the drawing details differed from the assumptions in ECR TM 11-00426. Exelon was unable to recover additional design information or installation records to demonstrate that the seismic gap seal was properly installed and configured to the requirements specified in E-107-012, or was otherwise qualified as a watertight seal. As a result, Exelon sampled sections of the seismic gap seal and determined that portions of the seal were not installed to the required minimum depth of nine inches and that the actual seal installation was configured differently than assumed. Exelon entered this issue into their corrective action program as issue reports (IR) 1341027 and 1341537, and took appropriate interim corrective actions. In June 2012, Exelon implemented permanent modifications to restore the watertight function of the seismic gap barrier, under ECR 12-00160, "RB Seismic Gap Flood Seal." The inspectors' independent review of that modification was documented in NRC Inspection Report 05000289/2012003, Section 1R18, “Permanent Modifications."

On September 5, 2012, Exelon completed laboratory tests of the as-installed seal configuration to determine whether it was suitable to satisfy the design basis PMF hydrostatic demands. Technical Evaluation 1170013-06 assessed the laboratory test results and concluded that the installed configuration would not satisfy the requirements for a watertight seal design. Additionally, Exelon quantified the expected leakage that would be expected during a design basis PMF event to evaluate the consequences on the ability to maintain the plant in a safe shutdown condition. During a PMF event, Exelon estimated that approximately 180,000 gallons of water would leak into the tendon access gallery. Exelon determined that volume of water would fill those areas from the bottom (265 feet elevation) to an elevation of approximately 286.6 feet. Because the equipment needed for safe shutdown, specifically the emergency feedwater pumps, was located on the 295 feet elevation, Exelon concluded that no adverse impact to the plant was expected. Exelon entered these issues into their corrective action program as IRs 1382505, and 1428726.

Analysis: The inspectors determined that the failure to construct, maintain, and inspect the seismic gap flood seal consistent with its design (e.g., watertight) was a performance deficiency within Exelon's ability to foresee and prevent. This issue was more than minor because it was similar to Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," Example 3.j, in that the seal's as-built and maintained configuration resulted in a condition where the inspectors had reasonable doubt regarding the functionality of the seismic gap seal to remain watertight during a PMF event. In addition, the performance deficiency was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

In accordance with IMC 0609 Attachment 4, "Initial Characterization of Findings," this issue was evaluated using IMC 0609 Appendix G, "Shutdown Operations Significance Determination Process (SDP)," Attachment 2, "Phase 2 SDP for PWR during Shutdown," because the plant was expected to be shutdown and on decay heat removal (DHR) prior to flood waters reaching the seismic gap seal. A Region I Senior Reactor Analyst performed a detailed risk evaluation, in accordance with IMC 0609, Appendix G,

Attachment 2, Worksheet 3, "Loss of Off-site Power in POS 1 (RCS Closed)." The following assumptions were made:

- The reactor would be shutdown and on DHR before flood water would reach the seismic gap seal. This was based on the design basis PMF developing slowly and the Technical Specification requirement to shutdown prior to the river water level reaching the design basis flood level of 305 feet.
- The leakage past the seismic gap seal was bounded by test results evaluated in Technical Evaluation 1170013-06. Based on the as-found physical configuration, a total seal failure was not considered credible.
- A loss of off-site power was assumed to occur when flood water reached an elevation of 305 feet, due to flooding of the switchyard.
- The emergency diesel generators (EDG) were not affected by the seismic gap seal leakage issue.
- The station black out diesel generator was assumed to be unavailable, due to flooding of the room or support systems.
- The site had some capability to utilize severe flood mitigation strategies.
- The initiating event frequency of 2E-4 for the PMF was obtained from the TMI Individual Plant Examination of External Events.
- Flood duration of 60 hours was approximated from the UFSAR.
- The unavailability for this watertight seal was assumed to be greater than one year.

The dominant sequence for this event was a flood induced loss of off-site power combined with:

- a failure of the emergency diesel generators, and
- a failure to establish steam generator cooling, and
- a failure to recover off-site power.

Based on the initiating event frequency and multi-train EDG configuration, the increase in core damage frequency was determined to be low E-7. No large early release was considered because TMI had a large dry containment and steam generator tube rupture was not an event of concern. Therefore, this issue was determined to be of very low safety significance (Green).

This finding had a cross-cutting aspect, as described in IMC 0310, "Components with Cross-Cutting Areas," in the area of Human Performance, Decision Making, because Exelon failed to verify the validity of underlying assumptions or continued functionality of the seismic gap flood seal following an external flood re-analysis which revised the design basis PMF conditions. [H.1(b)]

Enforcement: The proposed Atomic Energy Commission General Design Criterion 2, "Performance Standards," dated July 1967, is the applicable regulatory requirement for TMI Unit 1 and, in part, required that essential systems and components be designed, fabricated, and erected to performance standards that would ensure the facility to withstand, without loss of capability to protect the public, the addition forces that might be imposed by natural phenomena such as flooding conditions (UFSAR Section 1.4.2). UFSAR Section 2.6.5, "Design of Hydraulic Facilities," in part, stated that the facilities were constructed and would be maintained and inspected consistent with their design, and that a commitment was made to the Atomic Energy Commission that the plant would be provided with component protection to the degree which would assure a safe

and orderly shutdown for the level of flooding postulated for a PMF event. Specifically, Section 2.6.5 stated that "The 3 inch seismic gap between this [the Fuel Handling Building] and the Reactor Building was made watertight," and "All openings below PMF elevation that are potential leak paths (ducts, pipes, conduits, cable trays, seismic gaps, and so forth) are sealed."

Contrary to the above, as of March 14, 2012, Exelon had not constructed, maintained, or inspected the seismic gap flood seal to ensure that the seal would remain watertight during a PMF event, as required by the TMI design. Because this issue was of very low safety significance (Green) and Exelon entered this issue into their corrective action program (IRs 1341027, 1341537, 1382505, and 1428726), this finding is being treated as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000289/2012005-01, Adequacy of Seismic Gap Flood Seal)**

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

.1 (Closed) Licensee Event Report (LER) 05000289/2011-001-00: Unanalyzed Condition Affecting Probable Maximum Flood Level

On September 26, 2011, TMI completed a revised river stage discharge analysis, which was initiated in 2010 (Pre-Fukushima), that resulted in a higher PMF level than what is described in their Updated Final Safety Analysis Report (UFSAR). This was reported to the NRC as an unanalyzed condition under 10 CFR 50.72 (b)(3)(ii)(B) (EN #47294 on September 26, 2011). LER-related elements were reviewed and documented in the following NRC reports (see references for ADAMS ML number):

- 2011005 – Focused PI&R sample review of TMI's flooding protection (section 4OA2.4) and event follow-up (section 4OA3.1), resulting in two unresolved items and one non-cited violation:
  - URI 05-289/2011005-03, Adequacy of Seismic Gap Flood Seal
  - URI 05-289/2011005-04, Adequacy of Flood Protection without Consideration of Wind Generated Wave Activity
  - NCV 05-289/2011005-05, Failure to Identify a Non-Conservative Technical Specification following Revision to River Stage Discharge Analysis

- 2012002 – Focused PI&R sample review of TMI's flooding analysis (section 4OA2.3), no findings identified.

- 2012003 – Closure of URI 05-289/2011005-04, Adequacy of Flood Protection without Consideration of Wind Generated Wave Activity (section 4OA5.1), to no findings identified.

- 2012005 – Closure of URI 05-289/2011005-03, Adequacy of Seismic Gap Flood Seal (4OA2.6), to one non-cited violation:
  - NCV 05-289/2012005-01, Adequacy of Seismic Gap Flood Seal

These issues do not pose an immediate safety concern based on Exelon's corrective actions taken and documented in the reference reports. This LER was reviewed and no new findings or violation of NRC requirements were identified. This LER is closed.

.2 (Closed) LER 05000289/2012-003-00: Pressurizer Heater Bundle Leak

On August 22, 2012, TMI discovered an unisolable leak from the upper pressurizer heater bundle during leak search activities in the reactor building. Exelon conducted a reactor shutdown and cooldown to cold shutdown conditions in accordance with TS 3.1.6.4 and 3.1.6.6. Exelon determined the root cause of the leak was primary water stress corrosion cracking of the Alloy 600 pressurizer heater bundle diaphragm plate. The heater bundle and diaphragm plate was replaced with one of a non-Alloy 600 material and tested satisfactory. The remaining Alloy 600 susceptible heater bundle was also tested satisfactorily and is planned to be replaced in the next refueling outage. The unit was returned to service September 4, 2012. The LER was reviewed. No findings or violation of NRC requirements were identified. This LER is closed.

.3 (Closed) LER 05000289/2012-004-00: Reactor Trip During Downpower Due to Condensate Booster Pump Trip

On August 22, 2012, during the TS required shutdown related to LER 05-289/2012-003-00 (see Section 4OA3.2), TMI experienced a reactor protection system trip from a valid high reactor coolant pressure signal from 30 percent reactor power. The cause of the reactor high pressure was the loss of main feedwater caused by a logic trip of the only operating condensate booster pump (CO-P-2C). Exelon determined the logic trip was caused by a stuck relay in the condensate “counting circuit” logic. Emergency feedwater automatically actuated to restore secondary water level. TMI operators took appropriate actions to stabilize the unit. The stuck relay was replaced and tested prior to startup, including raising the alarm priority of an early-warning computer alarm related to the “counting circuit” logic. The LER was reviewed. No findings or violation of NRC requirements were identified. This LER is closed.

.4 (Closed) LER 05000289/2012-005-00: Reactor Trip due to RC-P-1C Trip

On September 20, 2012, TMI experienced an automatic reactor runback and trip from full power in response to a spurious trip of the ‘C’ reactor coolant pump (RC-P-1C). TMI operators took appropriate actions to stabilize the unit in hot shutdown. Exelon determined the cause of the RC-P-1C trip was due to actuation of the motor’s differential current relay. Exelon did not determine a definitive root cause of the differential current trip of RC-P-1C nor evidence that it was a valid trip. The licensee replaced the affected relay, raised the actuation setpoint, and implemented a monitoring program. This relay does not have a reactor safety function. Exelon performed an operational decision evaluation prior to plant restart, in part, since no definitive cause of the RC-P-1C trip was identified. The LER was reviewed. No findings or violation of NRC requirements were identified. This LER is closed.

4OA5 Other Activities

.1 Temporary Instruction 2515/185, Revision 1, Follow-up On the Industry’s Groundwater Protection Initiative (2515/185 – 1 sample)

a. Inspection Scope

An NRC assessment was performed of the Three Mile Island Groundwater Protection Program during December 10 - 14, 2012, to determine whether Exelon (formerly

AmerGen in 2007) fully implemented the voluntary industry groundwater protection initiative, (Nuclear Energy Institute NEI 07-07 Industry Groundwater Protection Initiative (GPI) – Final Guidance dated August 2007, ADAMS Accession Numbers ML072610036 and ML072600292). The inspector interviewed personnel, reviewed applicable documents and performed walkdowns of monitoring wells. In addition, the inspector verified completion for the deviations to the acceptance criteria in NEI 07-07 that were reported in the NRC integrated inspection report 05000289/20100003:

GPI Objective 1.1 – Site Hydrology and Geology

1.1a Exelon had a hydrogeology study performed in 2006 and re-evaluated the study in 2011.
1.1b A knowledgeable Exelon employee reviewed the hydrogeology study to determine the dominant direction of groundwater flow and the effect of site modifications had on the prevailing groundwater flow direction.
1.1d Exelon has established a frequency to conduct a periodic review of the hydrogeology studies.

GPI Objective 1.2 – Site Risk Assessment

1.2a Exelon has identified Structures, Systems, and Components (SSCs) and work practices that could involve or could reasonably be expected to involve licensed material and for which there is a credible mechanism for licensed material to reach groundwater.
1.2b Exelon has identified leak detection methods for SSCs and work practices that could involve or could reasonably be expected to involve licensed material and for which there is a credible mechanism for licensed material to reach groundwater.
1.2c Exelon has made enhancements to leak detection systems and programs.
1.2d Exelon has made enhancements to prevent leaks or spills from reaching groundwater.
1.2f Exelon has established a frequency to conduct periodic reviews of SSCs and work practices to assure that leak detection methods and enhancements are effective in identifying and preventing leaks and spills from reaching groundwater.

GPI Objective 1.3 – On-Site Groundwater Monitoring

1.3f Exelon has established a long-term program for preventive maintenance of groundwater monitoring wells.
1.3g Exelon has established a frequency for periodic review of the groundwater monitoring program.

GPI Objective 1.4 – Remediation Process

1.4a Exelon has established written procedures outlining the decision making process for the remediation of leaks and spills.

GPI Objective 1.5 – Recordkeeping

1.5a. Exelon has established a recordkeeping process to meet the requirements of 10 CFR 50.75(g).

GPI Objective 3.2 – Review the program Under the Auspices of NEI

3.2b Exelon has performed an initial review of the groundwater protection program and has established plans to review the program every five (5) years.

b. Findings and Observations

No findings were identified. The Industry Groundwater Protection Initiative has been fully implemented at TMI.

.2 Temporary Instruction 2515/187, Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (2515/187 – 1 sample)

a. Inspection Scope

Inspectors verified that licensee's walkdown packages of the Intake Pumping Screenhouse (IPSH), Air Intake Tunnel (AIT), and EDG Building contained the elements as specified in NEI 12-07 Walkdown Guidance document:

The inspectors accompanied the licensee on their walkdowns of the IPSH and AIT and verified that the licensee confirmed the following flood protection features:

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed.
- Reasonable simulation
- Critical SSCs were measured
- Available physical margin, where applicable, was determined
- Flood protection feature functionality was determined using either visual observation or by review of other documents

The inspectors independently performed their walkdown and verified that the following flood protection features in the EDG building were in place.

- Flood protection feature functionality was determined using either visual observation or by review of other documents
- Ensured critical SSCs were measured
- External visual inspection for indications of degradation that would prevent its credited function from being performed was performed.
- Verified operability of EDGs during a PMF due to partial obstruction of combustion air intake

The inspectors independently verified that non-compliances with current licensing requirements, and issues identified in accordance with the 10 CFR 50.54(f) letter, Item 2.g of Enclosure 4, were entered into the licensee's corrective action program. In addition, issues identified in response to Item 2.g that could challenge risk significant equipment and the licensee's ability to mitigate the consequences will be subject to additional NRC evaluation.

b. Findings

.1 Failure to Identify and Correct Licensing Basis Flood Barrier and Support Equipment Deficiencies in Intake Screen and Pump House

Introduction. The inspectors identified an NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, in that Exelon failed to identify and correct conditions adverse to quality regarding the licensing basis external flood barrier integrity. Specifically, Exelon failed to identify and correct 13 unsealed penetrations through the Intake Screen and Pump House (ISPH) flood barrier and multiple deficiencies that challenged the fulfillment of ISPH support equipment capability to maintain the integrity of the licensing basis flood barrier.

Description. On September 26, 2011, Exelon completed a revised river stage discharge analysis and concluded that the licensing basis PMF had increased from 310' to 313.3' elevation, as measured at the ISPH. Exelon took prompt actions to modify all the flooding boundaries to withstand the increased PMF elevation.

The ISPH is a safety-related building that contains the safety-related river water pumps that provide cooling to TMI systems, structures, or components (SSCs) using the ultimate heat sink (Susquehanna River). The river water pumps are deep draft pumps that are located on the 308' elevation and take suction from river water located in a channel beneath the floor. The PMF flood barrier for the ISPH consists of 3 outer vertical walls, the floor, drain plugs and flood gates and inner wall at the entrance to the pump cubicles. The original licensing basis PMF height of 310' was analyzed to have no impact on safety related equipment in the ISPH due to the elevated location of the SSCs susceptible to the flood water on the 308' elevation. However, the revised PMF elevation of 313.3' was determined to impact safety related electrical equipment and safety related river water system operability. In the fall of 2011, Exelon performed modifications to the ISPH flood barriers and inspected the remaining flood barriers to confirm the system remained operable at the revised height of 313.3'.

In July 2012, Exelon performed flooding walkdowns of TMI Unit 1 in response to NRC Recommendation 2.3 Flooding Enclosure 4 of the March 12, 2012 10 CFR 50.54(f) letter (ADAMS ML12053A340) in order to verify that plant features credited in the current licensing basis (CLB) for protection and mitigation from external flood events are available, functional, and properly maintained. Exelon conducted the walkdowns in accordance with NEI 12-07, Rev. 0-A, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features."

In accordance with TI-187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," the NRC inspectors performed an inspection to verify that the licensee's external flood protection walkdown activities were conducted using NEI 12-07, which included inspector walkdowns of the ISPH flood protection features. As a result of the flood walkdowns, on July 24, 2012, the inspectors identified 13 unsealed penetrations in the floor of the ISPH. The penetrations were a direct bypass of the flood barrier (floor) which allowed river water access during a PMF to enter the protected pump cubicle area. Exelon entered the deficiency in the corrective action program under IR 1392609 and determined that the in-leakage, as a result of the penetrations, would be approximately 86 gpm. Exelon determined that the current proceduralized compensatory actions to address potential unidentified in-leakage into the pump cubicles would support operability. Specifically, two safety-related powered sump pumps are pre-staged in the ISPH during a PMF and the combined pump capacity is 100 gpm therefore; operations determined the flood barrier remained operable but degraded.

However, Exelon identified additional deficiencies related to the quantity, location and configuration of the pre-staged equipment used to mitigate in-leakage into the ISPH pump cubicles during their flood walkdowns in accordance with NEI 12-07. Specifically, on July 24, 2012 Exelon identified that the required quantity of drain line plugs and one of the ISPH sump pumps, FP-P-4B, were not stored in the designated storage location. TMI entered the issue in IR 1392569 and performed prompt corrective actions to replace/relocate the support equipment. Additionally, on August 29, 2012, Exelon identified that the discharge hose piping of the pre-staged sump pump was the incorrect size and could not be assembled and used as staged. TMI entered this deficiency into the CAP as IR 1406603. The proper discharge pipe was received onsite the following day. The combination of the above deficiencies further challenged the support equipment and compensatory actions capability to mitigate the PMF floodwater in-leakage through the floor flood barrier. The deficiencies were entered into the CAP and permanent corrective actions were taken to seal the penetrations and fully restore the support equipment capability for flood protection.

Analysis. The inspectors determined that the failure to identify and correct 13 unsealed penetrations through the ISPH flood barrier and multiple deficiencies that challenged the fulfillment of ISPH support equipment used to maintain the integrity of the licensing basis flood barrier was a performance deficiency that was within Exelon's ability to foresee and correct. The finding was determined to be more than minor because it is associated with the protection against external factors attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon did not identify and correct 13 unsealed penetrations in a licensing basis external flood barrier and its associated support equipment deficiencies such that the barrier is fully capable of maintaining the ISPH free of flood water. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, Exhibit 2 – Mitigating Systems Screening Questions and Exhibit 4 – External Events Screening Questions and determined that a detailed risk evaluation was required based upon the assumed complete failure of the IPSH flood barrier would degrade two trains of decay heat removal. The regional senior risk analyst (SRA) performed a detailed risk evaluation using the TMI SPAR model (version 8.18) in SAPHIRE 8 and determined the finding to be of very low safety significance (Green). The plant is assumed to be shutdown and on decay heat in accordance with station flood level response. Additionally, off-site power is assumed to be lost as a result of flooding of the switchyard. An event was created in the TMI SPAR model to represent the flooding condition that would challenge the flood barriers. The necessity of safety-related powered sump pumps to compensate for the in-leakage was modeled as a support dependency to the decay heat removal (DHR) system. The resulting change in core damage probability was less than 1E-7. The dominant sequence was a flooding event that challenged the DHR system and emergency feedwater in addition to the inability to implement extensive flood mitigation strategies.

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to identify the unsealed penetrations through the flood barrier and multiple deficiencies in supporting equipment in a timely manner commensurate with its safety significance. [P.1(a)]

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, require in part, that measures be established to assure that conditions adverse to quality, such as failure, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. Contrary to the above, Exelon

failed to identify and correct 13 unsealed penetrations through the ISPH flood barrier and multiple deficiencies that challenged the fulfillment of ISPH support equipment used to maintain the integrity of the licensing basis flood barrier. Because this violation was of very low safety significance and was entered into Exelon's corrective action program, this violation is being treated as an NCV, consistent with section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000289/2012005-02, Failure to Identify and Correct Licensing Basis Flood Barrier and Support Equipment Deficiencies in Intake Screen and Pump House)**

.2 Failure to Identify and Correct Missing Electrical Conduit Flood Seals in the Air Intake Tunnel

Introduction. The inspectors identified an apparent violation (AV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, during the TI-187 flooding walkdowns for Exelon's failure to identify and correct an external flood barrier deficiency. Specifically, Exelon failed to identify and correct, during external flood barrier walkdowns, that electrical cable conduits were not flood sealed in the Air Intake Tunnel (AIT), as designed, to maintain the integrity of the external flood barrier. The deficiency was entered into Exelon's CAP and prompt corrective actions were taken to seal the electrical conduits and restore the external flood barrier integrity.

Description. In July and August 2012, Exelon performed flooding walkdowns of TMI in response to NRC Recommendation 2.3 Flooding Enclosure 4 of the March 12, 2012 10 CFR 50.54(f) letter (ADAMS ML12053A340) in order to verify that plant features credited in the CLB for protection and mitigation from external flood events are available, functional, and properly maintained. Exelon conducted the walkdowns in accordance with (IAW) NEI 12-07, Rev. 0-A, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features."

In accordance with TI-187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," NRC inspectors performed an inspection to verify that the licensee's external flood protection walkdown activities were conducted IAW NEI 12-07. In August 2012, the inspectors accompanied the licensee during walkdowns of the AIT flood protection features. The AIT is a safety-related structure that is primarily below grade that provides an outside air source for the ventilation system of safety-related structures. Also, both safety and non-safety related cable conduits are routed underground from yard cable vaults through the AIT, beginning with a Crouse-Hinds coupling and ultimately terminate in the Auxiliary/Fuel Handling Building (Aux/FHB) where the cables exit the conduits through foam fire seals. The Crouse-Hinds coupling is attached to the solid cable conduit just after it enters the AIT and would be injected with flood sealant during construction to provide a design/licensing basis flood barrier function.

On August 02, 2012, during the TI-187 inspector-accompanied walkdown of the AIT, the inspectors identified numerous Crouse-Hinds couplings with visible external degradation due to being exposed to a wet environment. In addition, the inspectors identified that the couplings were missing plugs in the bottom drain ports and visually observed exposed cables from the open port. Subsequently, the inspectors informed Exelon that there was reasonable doubt of the existence of the flood seals based on the inspector's assessment of the Crouse-Hinds coupling as-found condition and observing the cables. The licensee took prompt actions to address the concern and confirmed, by visual and boroscopic inspections through the drain ports, that the flood sealant material was not

present in the Crouse-Hinds couplings or in the conduit. This finding is considered NRC-identified based upon the NRC value added during the AIT walkdown in that the inspector's concerns regarding the reasonable doubt of the seal integrity lead to the licensee's discovery of the missing flood barrier sealant. The condition was entered into the CAP (IR 1399510) and an extent of condition review identified a total of 43 Crouse-Hinds Couplings had deficient external flood barriers. This degraded condition was reported to the NRC in EN 48179 on August 10, 2012. Specifically, during a PMF without flood seal in the Crouse-Hinds couplings, flood water would become entrained in the cable conduits and flow through the AIT and ultimately into the Aux/FHB. The termination location of the cable conduits in the Aux/FHB would allow the flood water to impact safety-related equipment, most importantly decay heat removal. Exelon implemented prompt interim compensatory actions to restore operability of the flood barrier which included staging sand and large earth-moving equipment which would be used to fill the yard cable vaults containing the entrance to the aforementioned cable conduits and limit flood water leakage in order to maintain the decay heat removal function during a PMF.

Upon further review, the inspectors recognized that Exelon had prior opportunities to identify the degraded flood seal condition during previous focused flood barrier walkdowns. Specifically, in 2010, Exelon performed a comprehensive review and inspection of all, TMI Unit 1, external flood barriers, which included the AIT. Exelon conducted the review in response to an NRC inspection (see URI 05-289/2010009-04, ADAMS ML102530521 and NCV 05-289/2010005-02, ADAMS ML110340532) and to create a complete documented list of the credited external flood barriers and understand the condition of those barriers. During that review, Exelon identified that two pathways were not adequately sealed and would allow water to infiltrate the AIT, as reported in EN 46194, dated August 21, 2010. Exelon took immediate corrective actions as well as conducted a thorough extent of condition evaluation of flood boundaries in TMI Unit 1, including the AIT, to ensure the flood barrier was capable of performing its design basis function (IR 1104245). During the initial review, as well as the subsequent extent of condition, the licensee did not question the condition of the Crouse-Hinds couplings degraded condition. Exelon did not document significant issues regarding these couplings in the CAP or work order entries. The inspectors identified, during interviews, that engineering staff had relied on design and construction documentation to ensure the external flood barrier existed in the Crouse-Hinds coupling and that the external/internal condition of the coupling was not fully assessed. In addition, during the TI-187 walkdowns, the inspectors identified that the licensee did not fully assess the as-found condition and that the inspectors concerns regarding the material condition of the Crouse Hinds coupling and reasonable doubt of the seal integrity lead to the discovery that the flood boundary was not installed. The inspectors concluded that Exelon had reasonable opportunities to identify the deficiency in 2010 during the comprehensive and extent of condition reviews as well as during the NEI 12-07 flood walkdowns in the summer of 2012.

The finding does not present an immediate safety concern because Exelon implemented permanent corrective actions to seal the conduits identified in the AIT. Specifically, the unsealed electrical conduits were sealed by the injection of a watertight qualified sealant material into the associated cable conduits from the yard cable vaults. The sealant material, as well as the underground concrete encased conduits, became the credited external flood barrier and met the current licensing basis requirements. These actions were completed in November 2012.

Analysis. The inspectors determined that the failure to identify and correct, during external flood barrier walkdowns, that electrical cable conduits were not sealed in the AIT, as designed, to maintain the integrity of the external flood barrier was a performance deficiency that was within Exelon's ability to foresee and correct. The finding was determined to be more than minor because it is associated with the protection against external factors attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon failed, during multiple focused walkdowns, to identify the degraded external flood barrier in the Crouse-Hinds couplings in the AIT that challenged the external flood barrier operability. The safety significance of the degraded external flood barrier is to be determined and cannot accurately be calculated until additional testing and analysis of the as-found configuration is complete. Specifically, Exelon is performing additional testing on the capability of as-found foam fire sealant material, present in the conduits at the AIT/Aux Building interface, to mitigate flood water entry into the safety-related structures. These results will be an input into the NRC's safety significance determination and the licensee's flood mitigation aggregate impact review.

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to review the external flood barrier with a low threshold for identifying issues which resulted in the failure to identify the unsealed electrical conduits in the AIT in a timely manner commensurate with its safety significance. [P.1(a)]

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, require in part, that measures be established to assure that conditions adverse to quality, such as failure, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. Contrary to the above, Exelon failed to identify, during external flood barrier walkdowns, that electrical cable conduits were not sealed in the Air Intake Tunnel (AIT), as designed, to maintain the integrity of the external flood barrier. Exelon entered the issues into their corrective action program (IR 1399510). These issues are being characterized as an apparent violation in accordance with the NRC's Enforcement Policy, and its final significance will be dispositioned in separate future correspondence. **(AV 05000289/2012005-03, Failure to Identify and Correct Missing Electrical Conduit Flood Seals in the Air Intake Tunnel)**

.3 Temporary Instruction 2515/188, Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns (2515/188 – 1 sample)

a. Inspection Scope

The inspectors accompanied the licensee on their seismic walkdowns of:

- Control Tower, 380' elev. on August 14, 2012
- Fuel handling building, 305' elev. and spent fuel pool area on August 15, 2012
- Auxiliary building, 281' elev. on August 15, 2012
- Control Tower, 322' and 338', and intake screen / pump house on August 16, 2012
- Electrical cabinets in control tower at various elevations on November 11, 2012

SWEL items observed included 'B' emergency ventilation fan (AH-E-18B), spent fuel valves 4, 5, 6, 35, 37 and the 'B' spent fuel pool cooling pump. Other items include the 1B inverters, 4160V switchgear, engineering safeguards acculation cabinets, heat sink

protection system cabinets, reactor trip breaker control centers, 'B' reactor river pump and strainer, 'B' nuclear river pump, and 'B' decay heat river pump.

The inspectors verified that the licensee confirmed that the following seismic features associated with SWEL items inspected were free of potential adverse seismic conditions:

- Anchorage was free of bent, broken, missing or loose hardware
- Anchorage was free of corrosion that is more than mild surface oxidation
- Anchorage was free of visible cracks in the concrete near the anchors
- Anchorage configuration was consistent with plant documentation.
- SSCs will not be damaged from impact by nearby equipment or structures.
- Overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls are secure and not likely to collapse onto the equipment.
- Attached lines have adequate flexibility to avoid damage.
- The area appears to be free of potentially adverse seismic interactions that could cause flooding or spray in the area.
- The area appears to be free of potentially adverse seismic interactions that could cause a fire in the area.
- The area appears to be free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding).

The inspectors independently performed their walkdown and verified that the following SSCs were free of potential adverse seismic conditions:

- 'B' Emergency Diesel Generator fuel oil day tank and air reservoirs on August 16, 2012
- Motor-driven Emergency feedwater pumps on August 20, 2012
- RC-23 hydraulic snubber (and associated attachments) to the pressurizer spray line in the 'A' D-ring in reactor building on August 22, 2012
- Pressurizer attachments in the 'A' D-ring in reactor building on August 25, 2012

Observations made during the walkdown that could not be determined to be acceptable were entered into the licensee's corrective action program for evaluation.

Additionally, inspectors verified that items that could allow the spent fuel pool to drain down rapidly were added to the SWEL and these items were walked down by Exelon.

b. Findings

No findings were identified

.4 Correction to Previous Report

In report 05000289/2012004 the cross-cutting aspect description of NCV 2012004-01 in Section 1R05 incorrectly stated Human Performance, Resources. The correct description is Human Performance, Work Control, that corresponds to the documented MC 0310 cross-cutting aspect of H.3(b). There is no change in the documented cross-cutting aspect of the finding.

4OA6 Meetings, Including Exit

USNRC Chairman MacFarlane visit to Three Mile Island
On November 2, 2012, Chairman Macfarlane, accompanied by UN & IAEA Ambassador Macmanus and their staff and Mr. W. Dean, NRC Region I Regional Administrator, toured Three Mile Island Unit 1 and Three Mile Island Unit 2 control room and discussed station performance with Mr. R. Libra, Site Vice President, and other senior members of Exelon.

Annual PI&R Sample: Fire Suppression Spray Nozzle Blockage Operating Experience Evaluation
On December 13, 2012, the results of this inspection were discussed with Mr. Joe Dullinger, Director, Site Engineering, and other members of the licensee's staff.

Closure of URI 05000289/2011005-03, Adequacy of Seismic Gap Flood Seal
On December 14, 2012, inspectors presented a summary of the inspection results to Mr. David Atherholt, TMI-1 Regulatory Assurance Manager, Mr. John Piazza, TMI-1 Design Engineering Manager and other members of the engineering staff.

Quarterly Inspection Report Exit
On January 25, 2013, the inspectors presented the inspection results to Mr. Mark Newcomer, TMI Plant Manager, 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

D. Atherholt	Manager, Regulatory Assurance
T. Alvey	Manager, Chemistry, Environmental, & Radwaste
J. Bare	Systems Engineer, Ventilation
J. Baron	Chemistry Technician
J. Bomgardner	Chemistry Technician
F. Brown	Work Control Supervisor
J. Dullinger	Director, Site Engineering
J. Cavanaugh	Engineering
K. Coughlin	Senior Reactor Operator
S. Cvijic	Chemistry
D. Divittore	Manager, Site Radiation Protection
M. Fitzwater	Senior Regulatory Assurance Engineer
T. Flemming	System Engineer
T. Hanlon	Senior Instrument Chemist
M. Harrison	System Engineering Supervisor
M. Jewell	Fire Protection System Engineer
A. Krause	Manager, Balance of Plant Engineering
R. Libra	Site Vice President
G. McCarty	Supervisor, Radiation Protection
W. McSorley	Flood Protection Engineer
J. Morrissey	I&C Supervisor
M. Myers	Systems Engineer, Radiation Monitoring
R. Myers	Fire Marshall
M Newcomer	Plant Manager
D. Oshall	Senior Reactor Operator
J. Piazza	Senior Manager, Design Engineering
J. Popielarski	Work Management Director
T. Roberts	Manager, Radiological Engineering
C. Six	Operations Superintendent
C. Smith	Manager, Operations Services
M. Sweigart	Chemistry Laboratory Supervisor
S. Taylor	Fire Protection Program Engineer
P. Wagner	Supervisor, Electrical Maintenance
L. Weber	Environmental Chemist
M. Willenbecher	Work Week Manager

Other

D. Dyckman	Nuclear Safety Specialist, Pennsylvania Department of Environmental Protection, Bureau of Radiation Protection
M. Miller	Environmental Technician – Normandeau Associates

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000289/2012005-01	NCV	Adequacy of Seismic Gap Flood Seal (Section 4OA2.6)
05000289/2012005-02	NCV	Failure to Identify and Correct Licensing Basis Flood Barrier and Support Equipment Deficiencies in Intake Screen and Pump House (Section 4OA5.2.b.1)

Opened

05000289/2012005-03	AV	Failure to Identify and Correct Missing Electrical Conduit Flood Seals in the Air Intake Tunnel (Section 4OA5.2.b.2)

Closed

05000289/2011005-03	URI	Adequacy of Seismic Gap Flood Seal (Section 4OA2.6)
05000289/2011-001-00	LER	Unanalyzed Condition Affecting Probable Maximum Flood Level (Section 4OA3.1)
05000289/2012-003-00	LER	Pressurizer Heater Bundle Leak (Section 4OA3.2)
05000289/2012-004-00	LER	Reactor Trip During Downpower Due to Condensate Booster Pump Trip (Section 4OA3.3)
05000289/2012-005-00	LER	Reactor Trip due to RC-P-1C Trip (Section 4OA3.4)
2515/185, Rev. 1	TI	Follow-up on the Industry's Groundwater Protection Initiative (Section 4OA5.1)
2515/187	TI	Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (Section 4OA5.2)
2515/188	TI	Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns (Section 4OA5.3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Rev. 8
OP-TM-739-500, Response to Loss of 13.2kv Off-Site Power, Rev. 0
OP-TM-AOP-004, Tornado/High Winds, Rev. 3
SY-AA-101-146, Severe Weather Preparation and Response, Rev. 0
WC-AA-107, Seasonal Readiness, Rev. 10

Other
Hurricane Sandy Plant Status Matrix, 10/29/12
Hurricane Sandy Plant Status Matrix, 10/30/12
IRs 1432689 1432853 1432910 1432943 1432947 1433075
1433219 1433198 1433221 1433227 1433246 1433422
1402688

Section 1R04: Equipment Alignment

Procedures
1104-6, Spent Fuel Cooling System, Rev. 45
1104-29C, Spent Fuel Cleanup Processes, Rev. 35
1104-30, Nuclear River Water, Rev. 72
OP-TM-212-000, Decay Heat Removal System, Rev. 16
OP-TM-411-211, IST of MS-V-2A and MS-V-2B, Rev. 002
OP-TM-541-000, Primary Component Cooling, Rev. 16
OP-TM-541-461, IC & NS Temperature Control, Rev. 6
OP-TM-543-000, Decay Heat Closed System, Rev. 8
OP-TM-543-461, Makeup to DC-T-1A, Rev. 2
ST1303-4.13, RB Emergency Cooling and Isolation System Analog Test, Rev. 045

Drawings
302-202, Nuclear Services River Water System, Rev. 78
302-630, Spent Fuel Cooling System Flow Diagram, Rev. 32
302-640, Decay heat Removal Flow Diagram, Rev. 83
302-641, Decay Heat Pumps 1A/B Aux Systems Flow Diagram, Rev. 6
302-645, Decay Heat Closed Cycle Cooling Water Flow Diagram, Rev. 39

Other
IRs 1430534 1447940 1447801 1447752 1447490 1448256
1448185 1448096
TMI-1/FSAR 9.4 Spent Fuel Cooling System, Update-18, dated 4/2006

Section 1R05: Fire Protection

Procedures
MA-MA-796-024-1001, Scaffolding Criteria for the Mid-Atlantic Stations, Rev. 8
OP-TM-201-009, Control of Transient Combustible Material, Rev. 11
OP-TM-861-910, Emergency Ventilation of EG-Y-1A Room, Rev. 1

Other
Fire Hazard Analysis Report, Rev. 23
Three Mile Island Nuclear Station, Pre-Fire Plan, Rev. 3
IR 1445020
WO R2163835 R2116796 R2163596

Section 1R07: Heat Sink Performance

Procedures
1107-9, SBO Diesel Generator, Rev. 69
M-164, Station Blackout (SBO) Diesel Generator Major Inspection (Mechanical), Rev. 18

Other
WOs R2163624 R2205534 R2073309 R2117165

Section 1R12: Maintenance Effectiveness

IRs 1442224 1403278 1456412

Section 1R13: Maintenance Risk

Procedures
WC-AA-104, Integrated Risk Management, Rev. 19

Other
IRs 1438881, 1439670, 1440244
Tech Spec 3.5.7 and 3.3.1.1
Three Mile Island MA Plants Plan of the Day, 10/18/2012
TMI-1 Shirt Operation Logs, 11/12/12 and 11/13/12
Work Order #R2176705, 03, Integrated Risk Screening for MU-P-1B Outage
WorkWeek 1243 Rev. 2
Work Week 1246 Rev. 1, "Bravo" Workweek

Section 1R15: Operability Evaluations

Procedures
OP-AA-108-115, Operability Determinations (CM-1), Rev. 11

Other
NRC Part 21 documented in EN 48359 on September 28, 2012
IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications, 450-2010
IRs: 1428726, 1429564, 1432623
System Design Basis Document for Flood Protection Systems, Rev. 2

Section IR19: Post Maintenance Testing

Procedures
1107-9, SBO Diesel Generator, Rev. 69
1302-5.18A, HPI/LPI Flow Channel Calibration, Rev. 38
1302-5.31D, 4160 V 1E Bus Loss of Voltage/Degraded Grid Timing Relay Calibration & Logic Check, Rev. 20A
E-135, SBO Diesel Batteries Inspection, Rev. 9
OP-TM-211-000, Makeup and Purification System, Rev. 24

Other

WO	R2130741	R2189788				
IRs	1426488	1426591	1426683	1426958	1427040	1427062
	1427387	1427714	1427761	1428198	1428302	1428433
	1428591	1428929	1428979	1428989	1429096	1429108
	1429151	1429178	1429182	1429276	1429302	1429432
	1429482	1429527	1429564	1429565	1429567	1429704
	1429967	1430324	1430327	1432623	1438142	

Section IR22: Surveillance Testing

Procedures
1302-5.18, HPI/LPI Flow Channel Calibration, Rev. 38a
OP-TM-211, Makeup and Purification System, Rev. 24
OP-TM-214-201, IST of BS-P-1A and Valves, Rev. 11
OP-TM-EOP-010, Emergency Procedure Rules Guides and Graphs, Rev. 16
OP-TM-EOP-0101, Emergency Procedure Rules Guides and Graphs Basis Document, Rev. 7
Surveillance Frequency Control Program, TMI-1, Rev. 1

Drawings
302-661, Make-up & Purification Flow Diagram, Rev. 60

Other
IR 1436325
WO R2206745 R2163732
AR A2186859
Work Week Plan 1245 "A" Train Work Week, Rev. 0
C-1101-864-E420-001, SBO Battery and Charger Sizing and Hydrogen Generation Calculation, Rev. 0A

Section 1EP4: Emergency Action Level and Emergency Plan Changes

EP-AA-1000, "Standardized Radiological Emergency Plan," Revision 21
EP-AA-112, "Emergency Response Organization (ERO) Emergency Response Facility (ERF) Activation and Operation," Revision 16

Section 2RS01: Radiological Hazard Assessment and Exposure Controls

Procedures

RP-AA-203-1001	Personnel Exposure Investigations
RP-AA-210	Dosimetry Issue, Usage, and Control
RP-AA-401	Operational ALARA Planning and Controls
RP-AA-403	Administration of the Radiation Work Permit Program
RP-AA-403-1001	Radiation Work Permit Processing
RP-AA-460	Controls for High and Locked High Radiation Areas
RP-TM-460-1008	Locked High Radiation Area Key Controls

Issue Reports
1438379, 1438379, 1435432, 1429605, 1432989, 1443912

Personnel Exposure Investigations
12-023, 12-0414, 12-059

Miscellaneous Reports
Electronic Dose and Dose Rate Alarm Report for 2012
Performance Indicator Monthly Reports and associated Issue Reports

Section 2RS6 Radioactive Gaseous and Liquid Effluent Treatment & TI-2515/185

Procedures

EN-AA-407	Response to Inadvertent Releases of Licensed Materials to Groundwater, Surface Water or Soil
EN-AA-408	Radiological Groundwater Protection Program
EN-AA-408-4000	Radiological Groundwater Protection Program Implementation
EN-TM-408-4160	RGPP Reference Material for Three Mile Island
CY-AA-130-201	Radiochemistry Quality Control
CY-AA-130-320	Packard 2900TR/3100TR Liquid Scintillation Counter
CY-TM-170-203	Unit Vent (RM-A-8 and RM-A-9) Sampling
CY-TM-170-300	Offsite Dose Calculation Manual
CY-TM-170-301	Liquid and Gaseous Monthly Cumulative Dose Contributions and Projections
CY-TM-170-3003	Waste Evaporator Condensate Storage Tank Compositing
CP-N-1982	Operation of the Tri-Carb 2100 TR Spectrophotometer
CP-N-1853	Sampling of Waste Gas Decay Tanks
6610-ADM-4250.11	Releasing Radioactive Gaseous Effluents – Waste Gas Tanks A/B/C
OP-1101-2.1	Radiation Monitoring System Setpoints
OP-1104-27	Waste Disposal – Gaseous
OP-TM-232-551	Liquid Release of “A” WECST with WDL-P-14A
OP-TM-232-554	Liquid Release of “B” WECST with WDL-P-14B
OP-TM-823-406	RB Purge – Containment Closed
RP-AA-228	10 CFR 50.75(g) and 10 CFR 72.30(d) Documentation Requirements
6610-ADM-4250.01	Releasing Radioactive Liquid Waste
EML	Collection of Groundwater Samples for Radiological Analysis

Issue Reports

1229945, 924237, 1081998, 1041403, 1394915, 1436848, 1413406, 1329284, 1282812, 1231780

Nuclear Oversight Performance Assessment (PA) Reports

Audit NOSA-TMI-12-04 (AR 1310431), Chemistry, Radwaste, Effluent, and Environmental Monitoring Audit June 2012

Effluent Discharge Permits:

- Gaseous
  G-2012-08610, Reactor Trip Secondary Steam Release – Non-Routine
  G-2012-00027, Waste Gas Decay Tank – A
  G-2012-10026, Waste Gas Decay Tank – C
  G-2012-08020, Reactor Building Purge
  G-2012-12028, Waste Gas Decay Tank – B

- Liquid
  L-2012-11046, WDL-T-11B
  L-2012-11045, WDL-T-11A
  L-2012-11044, WDL-T-11B

Effluent Radiation Monitor Calibration Procedure Records
SP-1302-3.1, R.M.S. Calibration
RM-A-8G, Auxiliary Building/Fuel Handling Building – Particulate/Iodine Channels
RM-A-9G, Reactor Building Purge Exhaust – Particulate/Iodine Channels
SP-1302-3.1A, Victoreen Effluent Gas Channel Calibration
RM-A-8G, Auxiliary Building/Fuel Handling Building – Noble Gas Channel
RM-A-9G, Reactor Building Purge Exhaust – Noble Gas Channel

Gaseous HEPA/Charcoal Filters Test Records

U-36	Ventilation Filter DOP and Halide Testing
SP-1303-11.56	Fuel Handling Building ESF Air Treatment System Air Filter Testing

Liquid Monitor Functional Interlock Test Records

SP 1303-4.10	RM-L-12 Interlock Test
SP 1303-4.15B	Radiation Monitoring System Operability Test Liquid Channel RM-L-6
IC -174	Radiation Monitoring System Channel Test Liquid Channels RM-L-1Hi, 1Lo, 2,3,4,5,7,9

Miscellaneous Reports
Groundwater Sampling Results for October 2012
Laboratory Cross Check Results for 1st, 2nd, and 3rd quarters 2012 and 4th quarter 2011
2011 Annual Radioactive Effluent Release Report
2012 Land Use Census Report
System Health Report for Radiation Monitors- 4th quarter 2012
System Health Report for Aux/Fuel Handling Buildings - 4th quarter 2012
50.75 (g) Decommissioning Files
April-May 2012 RGPP Summary Monitoring Report (2ND Quarter 2012)
Performance Indicator Monthly Reports and associated Issue Reports

Section 4OA1: Performance Indicators

See Section 2RS01 and 2RS06 References

Section 4OA2: Identification and Resolution of Problems

Procedures
1104-45C, Fire Service Sprinkler System, Rev. 24
1104-45D, Fire Service Deluge System
1104-45E, Fire Service Pre-Action System
1104-45Q, TMI Outbuilding Fire Protection Systems, Rev. 19
1104-45R, Fire Service System Operations Surveillance, Rev. 56
1303-12.13, Fire System Flush 2" Drain – Deluge/Sprinkler Systems, Rev. 31
1303-12.16, Fire System Testing Air Tunnel Deluge Functional Test, Rev. 29
1303-12.17, Fire System Misc Deluge Function Test, Rev. 33
1303-12.18.1/2/3/4/5, Fire System Nozzle Flow Test (Exh 2, 3.4.1.7)
3303-A2, Fire Main Header Flush and Loop Test (Exh 2, 2.4.1.4, 2.4.1.7)
AP-1038, Administrative Controls – Fire Protection Program, Rev. 79
MA-TM-133-002, 50 Year Sample Testing of Fire Water System Sprinkler Heads, Rev. 0
MA-AA-716-008, Foreign Material Exclusion Program, Rev. 7
OP-AA-102-103-1001, Operator Burden and Plant Significant Decisions Impact Assessment Program, Rev. 4

OP-TM-226-901, Loss of All RCP Seal Cooling, Rev. 5
PLB-6-3, Diesel River Fire Pump Sprinkler, Rev. 121

Drawings
302-231, Fire Service Water Flow Diagram, Sheet 1, Rev. 109
302-231, Fire Service Water Flow Diagram, Sheet 2, Rev. 16
E-107-012, Architectural Special Area Plans, Sections, & Details, Rev. 5

Engineering Documents
Other
DC Cook 2 Licensee Event Report 1981-008, Fire Protection Spray Nozzle Blockage
DC Cook 2 Licensee Event Report 1981-009, Fire Protection Spray Nozzle Blockage
ECR TM 11-00426, Raise Level of External Flood Protection, Rev. 0
ECR 12-00160, RB Seismic Gap Flood Seal, Rev. 0
EGM-09-002, Enforcement Discretion for Fire Induced Circuit Faults, May 14, 2009
Exelon Nuclear Event Report LS-10-054, Clogging of the Uni 0 Over Lab Pre-action Spray System
Fitzpatrick Licensee Event Report 1981-052, Fire Protection Spray Nozzle Blockage
NEI 00-01, Guidance for Post-Fire Safe Shutdown Circuit Analysis, Rev 2, 3
NFPA 13A, Recommended Practice for the Inspection, Testing, and Maintenance of Sprinkler Systems
NPB-92, BISCO Seal Test Equivalency for Use in Conduit Sealing, Rev. 1
NRC Event Notification 47237, Monticello Blockage of Intake Structure Sprinkler System
Regulatory Guide 1.189, Fire Protection for Nuclear Power Plants, Rev. 2
Root Cause Evaluation 01302334, Intake Structure Fire Sprinkler Piping Blockage
Technical Evaluation 1170013-06, Consequence of Inadequate Flood Deal in Reactor Building Seismic Gap, Rev. 0
TMI Unit 1 Fire Hazards Analysis Report, Rev. 25
TQ-TM-106-MSO-C002, MSO Changes 2012, October 30, 2012

Maintenance Work Orders
R2063822 R2166971 R2171168

Issue Reports

0765796	1360221	1370566	1371055
1017441	1360224	1370608	1371056
1059605	1360225	1370618	1381850
1120517	1360230	1370667	1405549
1179612	1370504	1370837	1405553
1331081	1370545	1370839	1426736
1360162	1370558	1371044	1426736
1360216	1370561	1371048	1426736

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

IRs

1406234	1403278	0184753	0878425
1403366	1321322	0187903	

NRC Inspection Reports
05-289/2011005, ADAMS ML12039A087
05-289/2012002, ADAMS ML12122A131
05-289/2012003, ADAMS ML12214A466

Other
Apparent Cause Evaluation for IR 1406234
LER 50-289/2003-003-00, Reactor Coolant Pressure Boundary Leakage Due to Degradation of an Alloy 600 Pressurizer Heater bundle Diaphragm Plate
Event Notification, 47294, September 26, 2011
Event Notification, 48220, August 22, 2012
Event Notification, 48221, August 22, 2012
MPR-3814, TMI RC-P-1C Pump Trip – Root Cause Investigation, dated October 11, 2012
PowerLabs Failure Analysis Report for Relay CO-P-2/52X5B, dated September 24, 2012
Root Cause Evaluation Report for IR 1403366
Root Cause Evaluation Report for IR 1416103

Section 4OA5 : Identification and Resolution of Problems

Procedures
MA-TM-122-901, Install U1 Flood Barriers, Rev. 2
NEI 12-07, Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features, Rev. 0-A
SDBD-T1-122, System Design Basis Document for Flood Protection Systems, Rev. 2

Drawings
4692-51-120-1-0, TMI-1 Emergency Ventilation Fan Mounting, Rev. 1
1E-122-01-1002, TMI Flood Barrier System, Control Building Details, Rev. 1
1E-122-01-1007, TMI Flood Barrier System Air Intake Tunnel, Rev. 1
1E-122-01-1005, TMI Flood Barrier System Auxiliary Building Details, Rev. 0
E-216-022, Electrical Manholes & Underground Ducts Aux Building to Screen House Area, Rev. 17
1E-155-02-001, General Arrangement Control Room Tower, Rev. 12
D-215-162, Electrical Conduit and Cable Layouts Air Intake Tunnel, Rev. 22
E-107-012, Architectural Special Area Plans, Sections, & Details, Rev. 5

Engineering Documents
ECR TM 11-00426, Raise Level of External Flood Protection, Rev. 0
ECR 12-00160, RB Seismic Gap Flood Seal, Rev. 0
NPB-92, BISCO Seal Test Equivalency for Use in Conduit Sealing, Rev. 1
Seismic Walkdown Checklist for SWEL items
Seismic Walkdown Report – Stevenson & Associates 12Q0108.70-R-001, Rev. 1
Technical Evaluation 1170013-06, Consequence of Inadequate Flood Deal in Reactor Building Seismic Gap, Rev. 0

Other
Electric Power Research Institute (EPRI) document 1025286 titled, “Seismic Walkdown Guidance,” May 2012, (ADAMS Accession No. ML12164A181)
Electric Power Research Institute (EPRI) document 1025286 titled, “Seismic Walkdown Guidance,” Final, June 2012
Flooding Walkdown Report, November 2, 2012
ECR 10-00545, Rev. 0, 1

ENs	46194	48179				
IRs	1104245	1442527	1415285	1399510	1401686	1413215
	1406827	1407003	1407060	1404291	1403814	1403177
	1403172	1403154	1399136	1399702	1401842	1401487
	1401589	1400966	1400309	1396910	1393442	1392609
	1399630	1399143	1399702	1399510	1268247	1276881
	1341027	1341537	1382505	1428726		

Operability Evaluation for AH-E-18B mounting (IR 1400723/1400762), dated September 13, 2012
Operability Evaluation for RC-23 hydraulic snubber (IR 1403542)
Scaffold Evaluation A2053402-01

LIST OF ACRONYMS

ADAMS	Agencywide Documents and Management System
ALARA	As Low As Reasonably Achievable
AH	Air Handling
AV	Apparent Violation
CFR	Code of Federal Regulations
DHR	Decay Heat Removal
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
EML	Environmental Midwest Laboratory
EPIP	Emergency Plan Implementing Procedures
ESF	Engineered Safety Features
FS	Fire Suppression
FSAR	Final Safety Analysis Report
GPI	Groundwater Protection Initiative
HEPA	High Efficiency Particulate Air
IAEA	International Atomic Energy Agency
IMC	[NRC] Inspection Manual Chapter
IR	Issue Report
LCO	Limiting Condition for Operation
NRC	Nuclear Regulatory Commission
NSIR	[NRC] Office of Nuclear Security and Incident Response
OpE	Operating Experience
ODCM	Offsite Dose Calculation Manual
PADEP	Pennsylvania Department of Environmental Protection
PEI	Personnel Exposure Investigation
PMF	Probable Maximum Flood
RB	Reactor Building
RCA	Radiological Controlled Area
RTV	Room Temperature Vulcanization
RWP	Radiation Work Permit
SDP	Significance Determination Process
SER	Safety Evaluation Report
SSC	Structures, Systems and Components
ST	Surveillance Test
TMI	Three Mile Island, Unit 1
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
UN	United Nations
URI	Unresolved Item
WECST	Waste Evaporator Condensate Storage Tank
WGDT	Waste Gas Decay Tank