UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

February 3, 2011

Mr. Michael 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, UNIT 1 – NRC INTEGRATED INSPECTION REPORT 5000289/2010005

Dear Mr. Pacilio:

On December 31, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Three Mile Island, Unit 1 (TMI) facility. The enclosed inspection report documents the inspection results, which were discussed on January 7, 2011, with Mr. William Noll 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 finding and one self-revealing finding of very low safety significance (Green). One of the findings was determined to involve a violation of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating one of these findings as a non-cited violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administration, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspectors at the Three Mile Island facility. In addition, if you disagree with the characterization of the cross-cutting aspect of 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 Senior Resident Inspector at the Three Mile Island facility. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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 610-337-5200 if you have any questions regarding this letter.

Sincerely,

Ronald R. Bellamy

Ronald R. Bellamy, Ph.D., Chief
Projects Branch 6
Division of Reactor Projects

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

Enclosure: Inspection Report 05000289/2010005
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

Docket No:	50-289
License No:	DPR-50
Report No:	05000289/2010005
Licensee:	Exelon Generation Company
Facility:	Three Mile Island Station, Unit 1
Location:	Middletown, PA 17057
Dates:	October 1 through December 31, 2010
Inspectors:	D. Kern, Senior Resident Inspector J. Heinly, Resident Inspector R. Nimitz, Senior Health Physicist J. D'Antonio, Senior Operations Engineer J. Brand, Reactor Inspector F. Arner, Senior Reactor Inspector
Approved by:	R. Bellamy, Ph.D., Chief Projects Branch 6 Division of Reactor Projects (DRP)

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SUMMARY OF FINDINGS

IR 05000289/2010005 10/1/2010-12/31/2010; Exelon Generation Company, LLC; Three Mile Island, Unit 1, Maintenance Effectiveness and Identification and Resolution of Problems.

The report covered a three-month period of baseline inspection conducted by resident inspectors and announced inspections by regional inspectors. Two Green findings were identified, one of which was a non-cited violation (NCV). The significance of most findings is indicated by their color (greater than Green, or Green, White, Yellow, Red); the significance was determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP);" the cross-cutting aspect was determined using IMC 0310, "Components Within the Cross-Cutting Areas;" and 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," Rev. 4, dated December 2006.

Cornerstone: Initiating Events

Green. A self-revealing Green finding was identified, because station personnel did not establish a periodic task to calibrate and/or replace the integrated control system (ICS) to digital turbine control system (DTCS) signal convertor, a critical component, in accordance with procedure MA-AA-716-210, Performance Centered Maintenance (PCM) Process, Rev. 10. Consequently, the signal converter remained in operation past the vendor recommended service life and failed due to age related degradation, causing a turbine trip and a plant power transient from 100 to 14 percent reactor power. Station personnel replaced the failed signal convertor, entered the issue into the corrective action program (Issue Report 1115086), and performed extent-of-condition reviews regarding other critical station components.

The finding is more than minor because it adversely affected the equipment performance attribute of the initiating events cornerstone and the associated cornerstone objective to limit the likelihood of those events that upset plant stability. The inspectors evaluated the finding in accordance with IMC 0609.04, Phase I – Initial Screening and Characterization of findings. The finding was of very low safety significance because although it contributed to increased likelihood of a plant trip, it did not affect the likelihood that accident mitigation equipment or functions would be available. The finding had a cross-cutting aspect in the area of Problem Identification & Resolution, Operating Experience (OE) component because station personnel did not properly collect and evaluate industry OE, including vendor recommendations, to establish appropriate preventive maintenance (PM) tasks (e.g., calibration, replacement) for the ICS to DTCS signal converter to minimize consequential failures [P.2(a)]. (Section 1R12)

Cornerstone: Mitigating Systems

Green. The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings for deficient internal and external flood barrier inspection procedures. Specifically, no instructions, procedures, or drawings existed to periodically inspect all openings that are potential leak paths to prevent water intrusion into areas of the plant containing safety related equipment during a design basis internal or external flood event. Consequently, TMI failed to identify two

external flood barriers in the air intake tunnel (AIT) structure that had been missing since original construction, which were needed to protect safety-related equipment in the auxiliary building.

This finding is more than minor because it was associated with the protection against external factors (floods) attribute and affected the mitigating systems cornerstone objective of ensuring the availability, reliability and capability of systems (including flood barriers) that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding in accordance with IMC 0609.04, Phase I – Initial Screening and Characterization of findings. This finding was of very low safety significance because the condition did not result in an actual failure of any safety-related system or component, or result in the system being declared inoperable for greater than its allowed technical specification outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Operating Experience (OE), because station personnel did not properly implement and institutionalize internal and external OE through changes to station procedures to address safety related flooding inspection and design vulnerabilities [P.2(b)]. (Section 4OA2.2)

Licensee-Identified Violations

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

REPORT DETAILS

Summary of Plant Status

Three Mile Island, Unit 1 (TMI) began the period at approximately 100 percent rated thermal power. Reactor power was briefly reduced to 89 percent on December 4 to support scheduled turbine valve stroke testing. Following successful completion of the test, operators returned the plant to full power operation.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

a. Inspection Scope (Cold Weather)

The inspectors walked down risk significant plant areas during the week of November 29 to assess Exelon's protection for cold weather conditions. The inspectors evaluated outside instrument line conditions and the status of the heat trace system. The walkdown included the borated water storage tank, control building battery rooms, emergency diesel generators (EDGs), and safety-related river water system components located in the river water intake structure. The inspectors also reviewed implementation of procedure WC-AA-107, Seasonal Readiness, Rev. 9.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

Partial System Walkdowns (71111.04Q – 3 samples)

The inspectors performed three partial system walkdown samples on the following systems and components:

- On October 5, the inspectors walked down the 'D' 4KV and associated 480V emergency electrical system while the 'B' EDG was out of service for planned inspection and corrective maintenance;
- On October 6, the inspectors walked down the 'A' reactor river water train, including the emergency cooling water supplies (RR-V-3A and RR-V-3C) to the 'A' and 'C' reactor building cooling fans, while the RR-V-3B was out of service for a planned maintenance outage; and
- On October 27, the inspectors walked down the 'B' decay heat train, 'B' decay river water train, and the 'B' decay closed cooling water train while the 'A' low pressure

coolant injection train (DH-P-1A, DC-P-1A, and DR-P-1A) and the 'A' building spray pump were unavailable due to a planned maintenance outage.

The partial system walkdowns were conducted to ensure redundant trains and standby equipment relied on to remain operable for accident mitigation were properly aligned. Additional documents reviewed during this inspection are listed in the attachment.

Complete System Walkdown (71111.04S – 1 sample)

On November 10, the inspectors performed one complete system walkdown of the makeup system, including 'B' and 'C' makeup pump alignment, while MU-P-1A was out of service for corrective maintenance. The inspectors conducted a detailed review of the alignment and condition of the system using piping and information diagrams and evaluated open corrective action program reports for impact on system operation. In addition, the inspectors reviewed the associated protected equipment log, and interviewed the system engineer and control room operators. Additional documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05Q – 2 samples)

.2 Routine Resident Inspector Tours

a. Inspection Scope

The inspectors conducted fire protection inspections for two plant fire zones, selected based on the presence of equipment important to safety within their boundaries. The inspectors conducted plant walkdowns and verified the areas were as described in the TMI Fire Hazard Analysis Report, and that fire protection features were properly controlled per surveillance procedure 1038, Administrative Controls-Fire Protection Program, Rev. 74. The plant walkdowns were conducted throughout the inspection period and included assessment of transient combustible material control, fire detection and suppression equipment operability, and compensatory measures established for degraded fire protection equipment in accordance with procedure OP-MA-201-007, Fire Protection System Impairment Control, Rev. 6. In addition, the inspectors verified that applicable clearances between fire doors and floors met the criteria of attachment 1 of Engineering Technical Evaluation CC-AA-309-101, Engineering Technical Evaluations, Rev. 11. Fire zones and areas inspected included:

- Fire Zone TB-FA-1, Turbine Building General Area; and
- Fire Zone AB-FZ-6, Demineralizers & 1A ESV MCC Area, Aux Building 305'.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the heat removal capability of the control building ventilation system per Procedures E-108.1, Periodic Inspection and Test of AH-C-4A and AH-C-4B, Rev. 1 and E-108.3, Cleaning and Inspection of AH-C-4A and AH-C-4B, Rev. 1. The control building ventilation system contains two chiller units, AH-C-4A and AH-C-4B, which are designed and operated to maintain the air temperature in the control building in accordance with the Updated Final Safety Analysis Report (UFSAR) limits. The chillers remove heat from the control building and transfer it to the nuclear service closed water system. The inspectors reviewed the data from the latest periodic (E-108.1) and annual (E-108.3) inspection and cleaning of the chiller units. In addition, the inspectors reviewed the tracking and trending data spreadsheets required to be maintained by the system engineer to independently assess the heat removal capability and performance of the system. The inspectors performed field walk downs and interviewed the system engineer, field technicians, and other personnel responsible for the oversight of the heat exchangers to assess the adequacy of performance monitoring.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program

.1 Licensed Operator Simulator Training (71111.11Q – 1 sample)

a. Inspection Scope

On October 26, the inspectors observed licensed operator requalification (LOR) training at the control room simulator for the 'A' operator crew. The inspectors observed the operators' simulator drill performance and compared it to the criteria listed in TMI Operational Simulator Scenario 54, Reactor Coolant System Leak, Steam Generator Tube Leak, and Loss of Subcooling Margin, Rev. 1. The inspectors reviewed the operators' ability to correctly evaluate the simulator training scenario and implement the emergency plan. The inspectors observed supervisory oversight, command and control, communication practices, and crew assignments to ensure they were consistent with expected control room activities. The inspectors observed operator response during the simulator drill transients. The inspectors evaluated training instructor effectiveness in recognizing and correcting individual and operating crew errors. The inspectors attended the post-drill critique and reviewed the written crew critique in order to evaluate the effectiveness of problem identification. The inspectors verified that emergency plan classification and notification training opportunities were tracked and evaluated for success in accordance with criteria established in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 6. Additional documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

.2 In-office Review of Annual Licensed Operator Examination (71111B - 1 sample)

a. Inspection Scope

On November 16, an NRC region-based operator licensing examiner conducted an in-office review of results of licensee-administered annual operating tests and comprehensive written exams for 2010. The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, Operator Requalification Human Performance Significance Determination Process (SDP). The inspector verified that:

- Crew failure rate was less than 20 percent. (Crew failure rate was 14.3 percent)
- Individual failure rate on the dynamic simulator test was less than or equal to 20 percent. (Individual failure rate was 11.8 percent)
- Individual failure rate on the walk-through test was less than or equal to 20 percent. (Individual failure rate was 2 percent)
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 80 percent. (Overall pass rate was 88.2 percent)

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors evaluated the listed samples for Maintenance Rule (MR) implementation by: ensuring appropriate MR scoping; characterization of failed structures, systems, and components (SSCs); MR risk categorization of SSCs; SSC performance criteria or goals; and appropriateness of corrective actions. Additionally, extent-of-condition follow-up, operability, and functional failure determinations were reviewed to verify they were appropriate. The inspectors verified that the issues were addressed as required by 10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants; Nuclear Management and Resources Council 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Rev. 2; and Exelon procedure ER-AA-310, Implementation of the Maintenance Rule, Rev. 8. The inspectors verified that appropriate corrective actions were initiated and documented in Issue Reports (IRs), and that engineers properly categorized failures as maintenance rule functional failures and maintenance preventable functional failures, when applicable.

- On September 19, the turbine load demand signal failed low causing the main turbine to runback from 100 percent power. The turbine tripped off-line from 26 percent reactor power and the plant stabilized at 14 percent reactor power. Technicians subsequently determined a signal converter from the integrated control system (ICS) to the digital turbine control system (DTCS) had failed, causing the runback;

- The inspectors reviewed implementation of the station expansion joint inspection and replacement program. This included records of expansion joint installation, expansion joint inspection, and associated corrective action program documents for the period 2008 – 2010; and

- The inspectors reviewed the failures of the 'A' EDG on April 30 and May 1, 2010 due to a clogged fuel injector drain line that developed excessive fuel oil leakage. Specifically, the fuel oil drain line clogged due to inadequate implementation of recommended preventive maintenance tasks.

b. Findings

See section 40A7 for a licensee-identified finding associated with excessive 'A' EDG fuel oil leakage.

Introduction: A self-revealing Green finding was identified, because station personnel did not establish a periodic task to calibrate and/or replace the ICS to DTCS signal convertor, a critical component in accordance with procedure MA-AA-716-210, Performance Centered Maintenance (PCM) Process, Rev. 10. Consequently, the signal converter remained in operation past the vendor recommended service life and failed due to age related degradation. The signal converter failure caused a turbine trip and a plant power transient from 100 to 14 percent reactor power.

Description: On September 19, the turbine ICS to DTCS signal converter failed low causing a turbine runback and associated plant transient from 100 percent to 14 percent power. Operators promptly took manual control of pressurizer spray to control reactor coolant system pressure and properly implemented abnormal operating procedures to manage the associated primary to secondary heat transfer upset. Technicians diagnosed the component failure, replaced the signal converter, completed post-maintenance testing, and operators restored the plant to full power on September 21.

The licensee root-cause evaluation (RCE) determined the signal converter had been in service since original installation in 1995 (15 years service). The mean time between failures (MTBF), as determined by the vendor, was 10 years. No periodic preventive maintenance (PM) requirements (e.g., calibration or replacement) had been implemented for the signal converter prior to this event. The hardware failure analysis concluded the signal converter failure was due to age related degradation.

Procedure MA-AA-716-210 states PCM is a process for selecting PM activities for components to minimize consequential failures. Further, generic PM recommendations contained in PCM templates should be used in conjunction with vendor recommendations to arrive at the optimum PM program for a specific component. In 2008, system engineers reviewed the station's PCM templates for all station equipment to verify appropriate PM requirements were identified and scheduled. Engineers reviewed the ICS on a system level. No specific component level PCM template existed for the ICS to DTCS signal converter. Despite containing several critical components, engineers determined no new component level PCM template would be created for ICS components. Additionally, the RCE identified three similar industry operating events (failure of the same model Action Pak signal converter), none of which had been previously evaluated as applicable to TMI. Therefore, engineers missed this opportunity to identify the need for a periodic replacement activity to ensure the signal converter (a

critical component) was replaced prior to exceeding its recommended service life. The licensee properly evaluated the event as a maintenance preventable functional failure. The inspectors reviewed the RCE and selected maintenance records, interviewed individuals, and concluded the RCE was thorough and appropriate corrective actions were identified (IR 1115086).

Analysis: Failure to establish and implement appropriate periodic preventive maintenance tasks (i.e., calibration, replacement) for the ICS to DTCS signal convertor was a performance deficiency. Consequently, the signal converter remained in operation past the vendor recommended service life, failed due to age related degradation, and caused a plant power transient from 100 to 14 percent reactor power.

The finding is more than minor because it adversely affected the equipment performance attribute of the initiating events cornerstone and the associated cornerstone objective to limit the likelihood of those events that upset plant stability. The inspectors evaluated the finding in accordance with IMC 0609.04, *Phase I - Initial Screening and Characterization of findings*. The finding was of very low safety significance because, although it contributed to increased likelihood of a plant trip, it did not affect the likelihood that accident mitigation equipment or functions would be available. The finding had a cross-cutting aspect in the area of Problem Identification & Resolution, Operating Experience (OE) component because station personnel did not properly collect and evaluate industry OE, including vendor recommendations, to establish appropriate PM tasks (e.g., calibration, replacement) for the ICS to DTCS signal converter to minimize consequential failures [P.2(a)].

Enforcement: This finding does not involve enforcement action because no regulatory requirement violation was identified. Station personnel entered the issue into the corrective action program, performed a root cause evaluation, implemented appropriate immediate corrective actions, and identified reasonable extent-of-condition assignments (IR 1115086). Because this finding does not involve a violation and has very low safety significance, it is identified as **FIN 05000289/2010005-01, Inadequate Preventive Maintenance for Signal Converter Causes Turbine Trip and Plant Transient.**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 samples)

a. Inspection Scope

The inspectors reviewed the scheduling, control, and equipment restoration during the following maintenance activities to evaluate their effect on plant risk. This review was against criteria contained in Exelon Administrative Procedure 1082.1, TMI Risk Management Program, Rev. 8 and WC-AA-101, On-Line Work Control Process, Rev. 17A.

- On October 5-7, emergency diesel generator EG-Y-1B and reactor river water valve RR-V-3B were unavailable due to planned maintenance outages. Both work activities extended past their planned durations, but each component was returned to operable status within its respective Technical Specification (TS) allowed outage time. Online maintenance risk was Yellow during this period;

- On October 13, 28, and 30, technicians performed troubleshooting activities on the Group 6 control rod drive mechanism secondary programmer in accordance with

work order A2257463 to identify and repair the cause of an August 16 ratchet trip. Online maintenance risk remained Green during this period;

- On October 26-27, the 'A' low pressure coolant injection train (DH-P-1A, DC-P-1A, and DR-P-1A) and the 'A' building spray pump were unavailable due to a planned maintenance outage. Online maintenance risk was Orange during this period; and

- On November 9, makeup pump 'A' (MU-P-1A) was removed from service for planned maintenance. The primary purpose of the outage was to replace a portion of bent piping in the motor bearing oil system. Station risk was Yellow during the period of MU-P-1A unavailability.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15 – 4 samples)

a. Inspection Scope

The inspectors verified the selected degraded conditions were properly characterized, operability of the affected systems was properly evaluated in relation to TS requirements, applicable extent-of-condition reviews were performed, and no unrecognized increase in plant risk resulted from the equipment issues. The inspectors referenced NRC Inspection Manual Chapter Part 9900, Operability Determinations & Functionality Assessments for Resolutions of Degraded or Nonconforming Conditions Adverse to Quality or Safety, Exelon procedure OP-AA-108-115, Operability Determinations, Rev. 9, and OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability Determinations, Rev. 2 to determine acceptability of the operability evaluations. Additional documents reviewed during this inspection are listed in the attachment. The inspectors reviewed operability evaluations for the following degraded equipment issues:

- On October 5-7, operators tagged out the reactor river water supply valve (RR-V-3B) to reactor building cooling fan AH-E-1B for a planned maintenance outage. The valve was de-energized and tagged in the open position. Operators determined that RR-V-3B and AH-E-1B remained operable in the as-tagged position. The inspectors agreed that the RR-V-3B reactor building cooling function remained operable. However, the inspectors identified deficiencies with how the RR-V-3B containment isolation safety function was addressed (IR 1123004);

- On October 6, instrumentation and control technicians performed a surveillance test on the makeup tank pressure transmitter (MU17-PT) and identified out-of-tolerance calibration points. The inspectors reviewed the past and current operability of the high pressure injection system with respect to the TS operating curves for makeup tank level and pressure. In addition, the inspectors reviewed the performance of the system during the September 19 turbine runback and reactor downpower. The inspectors concluded that the out-of-tolerance pressure transmitter did not impact the operability of the makeup tank and the high pressure injection system remained operable;

- On October 28, TMI personnel performed drilling operations near the secondary river water system piping as part of a troubleshooting plan to identify a potential underground water leak source. Inadvertently, the drilling operation struck the secondary river water 30" pipe, creating a small penetration in the pipe. Subsequently, while excavating around the secondary river water pipe, TMI personnel uncovered the 'A' decay river water pipe. The inspectors reviewed TMI's actions in response to the 'A' decay river water pipe being in a degraded condition due to its vulnerability to external events. The inspectors reviewed the licensee's operability evaluation and compensatory measures and independently confirmed that the 'A' decay river water piping continued to be operable. On November 5, TMI personnel completed the repairs and backfilled the excavation site; and

- The inspectors noted elevated area temperatures in the intermediate building and questioned whether this impacted associated safety related equipment service life or operability (IRs 465770, 1092405, 1092981). Operability evaluation 2010-02, determined safety related equipment within the intermediate building remained operable. However, the service life of several components (MS-V-13A/B solenoids and MS-PT-1183), were recently reduced due to engineering calculation revisions. The inspectors verified work activities were scheduled to replace these components prior to exceeding their revised service life.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 –1 sample)

a. Inspection Scope

The inspectors reviewed the following permanent plant modification to determine whether it was designed and/or implemented as required by Exelon documents CC-AA-102, Design Input and Configuration Change Impact Screening, Rev. 19 and CC-AA-103, Configuration Change Control, Rev. 20. The inspectors verified the modification supported plant operation as described in the UFSAR and complied with associated TS requirements. The inspectors reviewed the function of the changed component, the change description and scope, and the associated 10 CFR 50.59 screening evaluation.

- Change Request (ECR) TM 10-136, Improve Motor Operated Valve Setup Window – RR-V-3A/B/C, 4A/B/C, DH-V-4A/B, Rev. 0 was a permanent plant modification which installed a torque switch wiring by-pass to allow the valve motor operator to use a closed limit switch contact to bypass the closed torque switch to ensure full motor capability is available to close the valve. This ECR was performed to support improved valve operating margin, a larger actuator setup window, and continued use of the same surveillance test interval. Implementation for valve RR-V-3B was coordinated with periodic valve actuator diagnostic testing (PM202054) to minimize valve unavailability. On October 5-6, the inspectors observed portions of the implementation of this ECR on the RR-V-3B valve actuator.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (PMT) (71111.19 – 5 samples)

a. Inspection Scope

The inspectors reviewed and/or observed the following PMT activities to ensure: (1) the PMT was appropriate for the scope of the maintenance work completed; (2) the acceptance criteria were clear and demonstrated operability of the component; and (3) the PMT was performed in accordance with procedures.

- On October 6, operators performed OP-TM-534-207, IST of RR-V-3A/B/C and RR-V-4A/B/C/D, Rev. 0, as a PMT following a wiring modification to the reactor river valve 3B (RR-V-3B) (work order R2112618);

- On October 7, operators performed 1303-4.16, Emergency Power System, Rev. 125 following inspections and replacement of the #12 cylinder bearing;

- On October 27, operators performed OP-TM-212-201, In-Service Test of DH-P-1A and Valves from ES Standby Mode, Rev. 8, following a maintenance outage on the 'A' low pressure injection train that included maintenance on DH-P-1A, DH-V-4A, and DH-V-5A (work order R2167099);

- During the week of November 1, maintenance personnel replaced the nuclear service river water (NSRW) 'A' pump (NR-P-1A) and motor in response to degraded flow conditions. On November 6, the PMT was successfully performed in accordance with OP-TM-541-201, IST of NSRW Pumps and Valves (work order R2171192); and

- On December 2, station personnel verified appropriate pressure integrity of the make-up pump recirculation line following installation of a clamp device to repair a small leak in accordance with work order C2024596.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 6 samples)

a. Inspection Scope (3 inservice testing [IST] samples and 3 routine surveillance samples)

The inspectors observed and/or reviewed the following operational surveillance tests to verify adequacy of the test to demonstrate the operability of the required system or component safety function. Inspection activities included review of previous surveillance history to identify problems and trends, observation of pre-evolution briefings, and initiation/resolution of related IRs for selected surveillances.

- On October 15, procedure OP-TM-214-202, IST of BS-P-1B and Valves, Rev. 11;
- On October 20, procedure 1302-5.10, Reactor Building 4 PSIG Channel, Rev. 30 (IR 1131225);
- On November 12, procedure OP-TM-541-201, IST of NSRW Pumps and Valves, Rev. 7 (IR 1147647);

- On November 21, procedure OP-TM-211-206, In-Service Test of MU-P-1B, Rev. 5B;
- On December 4, OP-TM-301-302, Turbine Valve Full Stroke Test, Rev. 7; and
- On December 12, procedure 1303-5.2A, 'A' Emergency Loading Sequence and HPI Logic Channel/Component Test, Rev. 6

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 - 1 sample)

a. Inspection Scope

The inspectors observed an emergency event training evolution conducted on October 26, at the Unit 1 control room simulator to evaluate emergency procedure implementation, event classification, and event notification. TMI Operational Simulator Scenario 39, Uncontrolled Rod Withdrawal During Plant Startup, RCS Leak (RC-RV-1A) Causing ESAS Actuation, Followed by Loss of Station Power and Loss of Subcooled Margin, Rev. 4 involved multiple safety-related component failures and plant conditions warranting a simulated Alert event declaration. The inspectors observed the drill critique to determine whether the licensee critically evaluated drill performance to identify deficiencies and weaknesses. Additionally, the inspectors verified the Drill/Exercise performance indicators were properly evaluated consistent with NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 6. Additional documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety (OS)

RS01 Access Control to Radiologically Significant Areas (71124.01 – 1 sample)

a. Inspection Scope

The inspectors reviewed selected activities and associated documentation in the below listed areas. The evaluation of Exelon's performance was against criteria contained in 10 CFR 20, applicable Technical Specifications, and applicable station procedures.

Inspection Planning

The inspectors reviewed Performance Indicators (PIs) for the Occupational Exposure Cornerstone. The inspectors also reviewed the results of recent radiation protection program audits and assessments and any reports of operational occurrences related to occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors discussed plant operations to identify any significant new radiological hazard for onsite workers or members of the public. The inspectors assessed the potential impact of the changes and the periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors toured the radiological controlled area and reviewed radiological surveys from selected plant areas (Auxiliary Building, Spent Fuel Pool, and Containment Access Area) to verify that the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

Instructions to Workers

The inspectors toured the radiological controlled area and reviewed the labeling of radioactive material containers.

The inspectors selectively reviewed occurrences where a worker's electronic dosimeter noticeably malfunctioned or alarmed. The inspectors verified workers responded properly and that the issue was included in the corrective action program.

The inspectors selectively reviewed air sample survey records associated with Reactor Building work to verify that samples were collected and counted in accordance with procedures.

Contamination and Radioactive Material Controls

The inspectors observed locations where the licensee monitors potentially contaminated material leaving the radiological controlled area (RCA), and inspected the methods used for control, survey, and release from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use to verify that the work was performed in accordance with plant procedures and the procedures were sufficient to prevent unintended release of radioactive materials. The inspectors selectively verified that radiation monitoring instrumentation had appropriate sensitivity for the types of radiation present.

The inspectors reviewed the licensee's criteria for the survey and release of potentially contaminated material. The inspectors verified that there was guidance on how to respond to an alarm that indicates the presence of licensed radioactive material.

The inspectors reviewed the licensee's procedures and records to verify that the radiation detection instrumentation is used at its typical sensitivity level based on appropriate counting parameters (i.e., counting times and background radiation levels). The inspectors verified that the licensee did not establish a de facto "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high-radiation background area.

The inspectors selected two sealed sources from the licensee's inventory records that present the greatest radiological risk. The inspectors verified that the sources were accounted for and had been verified to be intact (i.e., they were not leaking their radioactive content).

The inspectors verified that any transactions (since the last inspection) involving nationally tracked sources were reported in accordance with 10 CFR 20.2207. The inspectors verified the licensee submitted its source reconciliation report.

Radiological Hazard Control and Work Coverage

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and other storage pools. The inspectors verified that appropriate controls (i.e., administrative and physical controls) are in place to preclude inadvertent removal of these materials from the pool.

The inspectors conducted selective inspection of posting and physical controls for high radiation areas (HRAs) and very high radiation areas (VHRAs), to the extent necessary to verify conformance with the Occupational PI.

Risk-Significant High Radiation Area and Very High Radiation Area Controls

The inspectors discussed with the Radiation Protection Manager the controls and procedures for high-risk HRAs and VHRAs including any procedural changes since the last inspection and the methods employed by the licensee to provide stricter control of VHRA access. The inspectors verified that any changes made did not substantially reduce the effectiveness and level of worker protection.

The inspectors discussed with first-line health physics supervisors the controls in place for special areas that have the potential to become VHRAs during certain plant operations.

The inspectors selectively verified that controls for VHRAs, and areas with the potential to become a VHRA, were controlled to prevent unauthorized access.

Radiation Worker Performance

The inspectors observed workers in the field during tours to evaluate general conformance with radiation protection procedures and practices.

The inspectors reviewed radiological problem reports since the last inspection to identify the cause of the event to be human performance errors. The inspectors determined if there was an observable pattern traceable to a similar cause and if corrective action was appropriate.

Radiation Protection Technician Proficiency

The inspectors observed radiation protection personnel and discussed ongoing activities to evaluate general conformance with applicable radiation protection procedures and practices.

Problem Identification and Resolution

The inspectors selectively verified through review of corrective action documents that problems associated with radiation monitoring and exposure control were being identified by the licensee at an appropriate threshold and were properly addressed for

resolution in the licensee corrective action program. The inspectors also selectively evaluated the appropriateness of the corrective actions for a selected sample of problems documented. (See Section 4OA2)

b. Findings

No findings were identified.

RS02 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

Inspection Planning

The inspectors selectively reviewed site specific procedures associated with maintaining occupational exposures as low as reasonable achievable (ALARA).

Radiological Work Planning

The inspectors compared accrued results achieved (dose rate reductions, person-rem used), as available, with the intended dose established in the licensee's ALARA planning for these work activities including person-hour estimates (fuel moves, in-service inspection, Alloy 600 work, reactor head plenum work, scaffolding, and steam generator work). The inspectors determined the reasons for inconsistencies between intended and actual work activity doses, as accrued.

Verification of Dose Estimates and Exposure Tracking Systems

The inspectors evaluated the licensee's methods of adjusting estimates or re-planning work, when unexpected change in scope or emergent work was encountered. The inspectors determined if adjustments to exposure estimates (intended dose) were based on sound radiation protection and ALARA principles. The inspectors reviewed station ALARA Committee reviews of work.

Problem Identification and Resolution

The inspectors determined if problems associated with ALARA planning and controls were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's corrective action program. The inspectors discussed corrective actions for identified ALARA concerns. (See Section 4OA2)

b. Findings

No findings were identified.

RS03 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

a. Inspection Scope

Inspection Planning

The inspectors reviewed the reported PIs to identify any related to unintended dose resulting from intakes of radioactive materials.

Problem Identification and Resolution

The inspectors reviewed and discussed problems associated with the control and mitigation of in-plant airborne radioactivity to evaluate the licensee's identification and resolution in the corrective action program. (See Section 4OA2)

b. Findings

No findings were identified.

RS04 Occupational Dose Assessment (71124.04)

a. Inspection Scope

Inspection Planning

The inspectors reviewed the most recent National Voluntary Laboratory Accreditation Program (NVLAP) accreditation report for licensee dosimetry.

Problem Identification and Resolution

The inspectors selectively reviewed corrective action documents to verify that problems associated with occupational dose assessment were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee corrective action program. (See Section 4OA2)

b. Findings

No findings were identified.

RS05 Radiation Monitoring Instrumentation (71122.05)

a. Inspection Scope

Problem Identification and Resolution

The inspectors selectively reviewed corrective action documents associated with radiation monitoring instrumentation to determine if the licensee identified issues at an appropriate threshold and placed the issues in the corrective action program for resolution. In addition, the inspectors evaluated the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring instrumentation. (See Section 4OA2)

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

Cornerstone: Mitigating Systems (6 samples)

The inspectors reviewed Exelon's assessment of safety system functional failures (SSFFs) for the period of September 2009 through September 2010. The inspectors verified accuracy of the reported data through review of selected station operating logs, system health reports, SSFF databases, maintenance rule databases, and Licensee Event Reports (LERs). The inspectors also reviewed Exelon's assessment of mitigating systems performance indicators (MSPIs) for the period of September 2009 through September 2010. Verification included the review of selected calculation methods, definition of terms, use of clarifying notes, Consolidated Data Entry MSPI Derivation Reports for unavailability and unreliability, monitored component demands, demand failure data, operator logs, maintenance rule database entries, operating procedures, and corrective action program documents. In addition, the inspectors reviewed the TMI MSPI basis documentation and the latest approved frequently asked questions (FAQs) to determine whether associated PI data had been accurately characterized and reported to the NRC in accordance with NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revs. 5 and 6. Additional documents reviewed are listed in the attachment.

The following PIs were evaluated:

- SSFFs
- MSPI: High Pressure Safety Injection System (Makeup)
- MSPI: Emergency Feedwater System
- MSPI: Emergency AC Power System (Emergency Diesel Generators)
- MSPI: Decay Heat Removal
- MSPI: Cooling Water Support Systems (Decay Closed, Decay River, Nuclear Closed, Nuclear River)

Cornerstone: Barrier Integrity (1 sample)

- Reactor Coolant System Activity

The inspectors also reviewed selected station records including operating logs, calculation methods, surveillance test reports, and IRs, observed associated surveillance tests, conducted interviews with operators and engineers, and performed equipment walkdowns to assess reactor coolant system activity for the period September 2009 through September 2010. This review was performed to determine whether associated PI data had been accurately reported to the NRC in accordance with NEI 99-02. Additional documents reviewed are listed in the attachment.

Occupational Exposure Control Effectiveness (1 Sample)

The implementation of the Occupational Exposure Control Effectiveness Performance Indicator Program was reviewed. The inspectors selectively reviewed corrective action program records for occurrences involving HRAs, VHRAs, and unplanned personnel radiation exposures for the period October 2009 to September 2010. The review was against the applicable criteria specified in NEI 99-02. The purpose of this review was to verify that occurrences that met NEI criteria were recognized and identified as Performance Indicators.

RETS/ODCM Radiological Effluent Occurrences (1 Sample)

The implementation of the Radiological Effluents Technical Specification/Offsite Dose Calculation Manual (RETS/ODCM) PI was reviewed. The inspectors selectively reviewed corrective action program records and projected monthly and quarterly dose assessment results due to radioactive liquid and gaseous effluent releases for the period October 2009 to September 2010. The review was against the applicable criteria specified in NEI 99-02. The purpose of this review was to verify that occurrences that met NEI criteria were recognized and identified as Performance Indicators.

As part of this review, the inspectors also reviewed Exelon's evaluations and public dose assessments associated with identification of localized ground water contamination.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Review of Issue Reports and Cross-References to Problem Identification and Resolution Issues Reviewed Elsewhere

a. Inspection Scope

The inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing a list of daily IRs, reviewing selected IRs, attending daily screening meetings, and accessing the licensee's computerized corrective action program database.

b. Findings

No findings were identified.

.2 (Closed) Unresolved Item (URI) 05000289/2010009-04: Potential Concern Regarding TMI's Internal and External Flood Protection Barriers and Mitigation Strategies

a. Inspection Scope

This URI was opened pending further NRC review of Exelon's initial inspection and safety assessment concerning the internal and external flood programs at TMI, including flood barrier design, inspections, maintenance, and repairs. Specifically, during the

biennial Problem Identification and Resolution (PI&R) baseline inspection, conducted in July 2010, Exelon was not able to demonstrate which barriers are credited as flood barriers, what the design and specified materials are, what the expected qualified life of the barriers is, or the condition of all credited barriers.

The inspectors reviewed Exelon's comprehensive design review and inspection of the TMI Unit 1 external flood barrier system which was completed in September 2010 per IR 677235. The inspectors reviewed applicable engineering assessment and corrective actions for several deficiencies identified during Exelon's review and external flood barrier inspections. This review included IRs 109533, 1102568, and 1104245, and the associated engineering technical evaluation, root cause analysis, and reportability evaluation regarding two missing external flood barriers in the air intake tunnel (AIT) identified by the licensee. The inspectors also reviewed the permanent modifications implemented to restore the two missing AIT external flood barriers. The inspectors reviewed MPR Associates Report LTR-80-903-02 which documents a review of TMI's Internal Flooding Licensing and Design Basis completed in May 6, 2009. In addition, the inspectors interviewed system and design engineers, and reviewed the UFSAR to assess the status of Exelon's plans for a comprehensive review and inspection of the TMI Unit 1 Internal Flood Barrier system. Additional documents reviewed are listed in the attachment.

b. Findings and Observations

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings for a deficient internal and external flood barrier inspection program. Specifically, no instructions, procedures, or drawings existed to periodically inspect all openings that are potential leak paths to prevent water intrusion into areas of the plant containing safety related equipment during a design basis internal or external flood event. Consequently, TMI failed to identify two external flood barriers in the AIT structure that had been missing since original construction, which were needed to protect safety-related equipment in the auxiliary building (AB).

Description: During the last PI&R team inspection, the inspectors questioned whether TMI had an effective program to monitor the condition of flood seal penetrations. This has been a long-standing issue for several years. A formal penetration seal inspection and evaluation program for external flood was only established in October 2009 and the initial round of seal inspections had not been completed. In addition, no similar formal penetration seal inspection program existed for internal flood barriers. Considering that the age of the flood seal components could be beyond the qualified lifetime, TMI may not be adequately identifying degraded or non-conforming conditions which could impact the operability of safety-related equipment during a design basis external or internal flooding event. As a result, the NRC opened URI 2010009-04.

In reviewing the URI, the inspectors noted the TMI UFSAR (Section 2.6.5) and other related plant-specific documents described requirements and methods to protect safety-related equipment from effects of internal and external flooding events. Various licensee documents indicated that between 1999 and 2007 station personnel had identified numerous generic industry and TMI-specific internal and external flood protection related issues for impact evaluation at TMI. Additional flood-related NRC generic communications and NRC inspector-identified concerns were entered into the corrective action program in 2006-2007 for resolution. In September 2007, the flood design

engineer identified that TMI had not identified all building penetrations that perform a flood mitigation function (IR 677235). Although no specific material deficiencies were identified at the time, actions were created to perform a design review to identify building penetrations with a flood protection function, inspect the material condition of the seals, evaluate the adequacy of the design, and establish a program for periodic inspections. Due to other priorities, this work was postponed and rescheduled multiple times.

TMI started a comprehensive review and inspection of the Unit 1 external flood barrier system in August 2009 and completed this review (IR 677235) on September 3, 2010. On August 21, 2010, engineers identified two openings in the AIT structure that had been unsealed since original construction, which would have the potential to allow water from a design basis flood to enter the AIT. The openings were a 6 inch AIT floor drain flood barrier and a 2 inch barrier from the AIT electrical vault. The licensee's evaluation determined that approximately 1500 gallons per minute (GPM) could have entered the AIT and then flow into the AB through the ventilation ductwork that connects the AIT and the AB. This condition could have resulted in the unavailability of multiple trains of safety-related equipment in the AB including the 1A and 1B decay heat pumps, the 1A and 1B building spray pumps, and the 1A, 1B, and 1C high pressure cooling injection pumps (make-up pumps). In addition, six other degraded seals were identified coming from non-safety related electrical vault (E-11) that led to the AIT sump area.

This degraded condition was reported to the NRC in accordance with 10 CFR 50.72 (b)(3)(v)(B) and 10 CFR 50.72 (a)(1)(ii) as a condition at the time of discovery which could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat. Specifically, flood water could have entered the AIT and flowed into the AB through the ventilation ductwork connecting the AIT to the AB. Upon further review, engineers determined that an installed non-safety related AIT deluge sump pump (SD-P-7) with a capacity of 1700 GPM was available and capable of removing water that may have reached the AIT prior to the water entering the AB. Therefore, safety related equipment in the AB building would not have been affected during a design basis flood event. As a result, Exelon retracted the 10 CFR 50.72 notification on October 19, 2010.

TMI's evaluation of the missing barrier determined the root cause was inadequate documentation of flood barriers system design requirements with a contributing factor of station personnel not being sensitive to the risk significance of an external flood. In reviewing the root cause for the missing external flood barriers under IR 1104245, TMI identified that in the last 10 years, several additional significant problems with flood barrier system design and maintenance were entered into TMI's corrective action process.

Corrective actions included plant modifications to restore the integrity of the flood barrier and a comprehensive design review and inspection of the external flood barrier system (ECR TM-10-545). Design documents will be integrated into site programs including emergency procedures, system health monitoring, maintenance rule inspections, and plant barrier impairment controls. In addition, communications and training are being used to increase understanding of site personnel regarding revised emergency procedures, the flood protection design basis document, and risk significance of an external flood. The root cause team also recommended that use of simulator or in-plant exercises be considered regarding flood events. In addition, the inspectors verified that similar corrective actions have been planned for a full comprehensive review and

inspection of internal flood barriers per IR 1104245, Action 32, and a review of foam type fire seals that are used as flood barriers per IR 1109631. The expected completion of these activities is Fall 2011.

Analysis: The failure to properly evaluate and correct a long standing deficient flood barrier inspection program is a performance deficiency. This finding is more than minor because it was associated with the protection against external factors (floods) attribute and affected the mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems (including flood barriers) that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the risk significance of this finding using NRC Manual Chapter 0609, Appendix A, Phase 1 Screening Worksheet. The finding screened to be very low safety significance (Green) because the condition did not result in an actual failure of any safety-related system or component, result in the system being declared inoperable for greater than its allowed technical specification outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Operating Experience because station personnel including system and design engineers, operators, and site management did not properly implement and institutionalize internal and external OE through changes to station procedures to address safety related flooding inspection and design vulnerabilities.

Enforcement: 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, requires, in part, that activities affecting quality be prescribed by and accomplished in accordance with documented instructions, procedures, or drawings. It further states that instructions, procedures, or drawings shall include appropriate quantitative and qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to this requirement, Exelon did not have instructions, procedures, or drawings to periodically inspect all openings that are potential leak paths to prevent water intrusion into areas of the plant containing safety related equipment during a design basis internal or external flood event.

Because this violation is of very low safety significance and was entered into TMI corrective action program (IR 635450, 677235, and 1104245), this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: **NCV 05000289/20100005-02, Deficient Internal and External Flood Barrier Inspection Program.**

.3 Annual Sample – Appropriate Preventive Maintenance Tasks Not Implemented for Critical Station Component – DTCS to ICS Signal Converter (1 sample)

a. Inspection Scope

The inspectors reviewed the RCE and corrective action assignments associated with the September 19, 2010 main turbine trip (also see Section 1R12 - IR 1115086). The inspectors verified whether the event was accurately documented, priority was consistent with issue significance, root and contributing causes were properly identified, assigned actions were reasonable to correct the identified causes, extent-of-condition evaluations were of appropriate scope and results, and whether the schedule for implementing corrective actions was commensurate with potential safety significance. Additional documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

.4 Annual Sample: Assessment of Corrective Actions for Issue Reports Associated With the Turbine Driven Emergency Feedwater Pump (TDEFW) (1 sample)

a. Inspection Scope

This inspection was conducted to assess Exelon's evaluation and corrective actions for issue reports associated with an emergency governor valve lever pin failure (IR 1083766) and an identified trend in the time required for the TDEFW pump to reach its acceptable speed criterion upon initiation (IR 1119907). The inspectors also reviewed Exelon's evaluation and corrective actions for a sample of industry OE issues related to governor valve stem binding, foreign material exclusion and turbine overspeed events. The OE review was performed to ensure Exelon adequately reviewed industry issues for applicability with their existing design and identified appropriate corrective actions when applicable.

For the IRs, the inspectors reviewed the emergency governor valve lever pin failure and increasing trend in the time to acceptable speed issues to ensure the corrective action program had completely and accurately documented the issues. The inspectors reviewed these corrective action samples to ensure that Exelon had appropriately considered the extent-of-condition and the apparent causes of the issues. Additionally, the inspectors reviewed the corrective actions proposed and completed to ensure they were reasonable to address the identified causes. The inspectors interviewed plant personnel to discuss the post failure analysis of the governor valve lever pin and TDEFW pump surveillance test results to ensure that Exelon's operability conclusions were reasonable. Finally, the inspectors performed a walkdown of the TDEFW pump to assess its overall material condition.

b. Findings and Observations

No findings were identified. The inspectors found that the emergency governor valve lever pin failure and increased trend in time to achieve acceptable turbine speed during startup testing had been accurately and completely documented within Exelon's corrective action program. Additionally, appropriate extent-of-condition reviews had been performed for the pin failure in the emergency governor valve lever connection. The inspectors found the apparent cause report to be detailed and reasonable based on Exelon's investigation of the failure, which included associated failure analysis test results. Additionally, the inspectors determined the corrective actions performed and proposed were reasonable to address the apparent causes of the issues. The inspectors noted that Exelon's procedure for monitoring the start time of the TDEFW pump has an appropriate test criterion which would ensure that the pump start time was maintained consistent with design assumptions. The inspectors determined for a sample of OE items reviewed that Exelon had appropriately evaluated the information for applicability to their TDEFW design and took appropriate corrective actions for the issues identified.

.5 Annual Sample – Maintenance Practices to Maintain Reliability of Aging Electolytic Capacitors (1 sample)

a. Inspection Scope

The inspectors selected the subject of electrolytic capacitor aging and preventive maintenance practices for detailed review. The inspectors reviewed licensee documents to determine whether the site-specific, fleet and industry operating experience had been reviewed and properly evaluated, corrective actions developed and implemented as required and the preventative maintenance program tools had been revised to incorporate operating experience. Documents reviewed are listed in the attachment.

b. Findings and Observations

No findings were identified. The inspectors identified differences between manufacturer recommendations, industry studies, and station practices regarding periodic maintenance (reforming) for electrolytic capacitors while they remained in stock (available for installation) and were not installed (IR 1096928). No TMI safety related equipment failures, related to electrolytic capacitor storage practices, were identified. The inspectors discussed the issues with station personnel who initiated appropriate actions to evaluate the issue.

.6 Annual Sample – Maintenance Practices to Maintain Reliability of Agastat Relays (1 sample)

a. Inspection Scope

This inspection was conducted to assess whether Exelon's maintenance practices for Agastat 7000 series time delay relays were reasonable to assure reliable relay performance. Specifically, during routine surveillance testing of a 4160V bus degraded grid timing Agastat relay in August 2007, Exelon identified that the time delay relay actuated outside of the acceptance criteria. The purpose of the relay is to ensure that safety related electrical equipment is protected from sustained degraded grid voltage conditions. The licensee identified that no preventive maintenance replacement task existed for the Agastat relay in accordance with the vendor recommendation. An extent-of-condition review identified 24 Agastat relays installed in safety related applications that were not replaced at the vendor recommended frequency. Further, in August 2010, an additional review was performed in response to recent industry operating experience associated with Agastat relay failures. This review identified an additional 27 Agastat relays installed in safety related applications that were not replaced within the vendor recommended frequency. The licensee performed corrective actions to address the condition adverse to quality for each relay identified. The inspectors reviewed the licensee's extent-of-condition review and performed an independent review to ensure all Agastat relays installed in safety related applications had been identified. Also, the inspectors interviewed plant personnel, reviewed surveillance test procedure results and the recent Agastat relay calibration history data to evaluate the performance of Agastat time delay relays. In addition, the inspectors reviewed the PCM template and vendor manual for appropriate maintenance and replacement frequency.

b. Findings

No findings were identified. The inspectors determined that Exelon's corrective actions associated with the maintenance practices of the Agastat time delay relays was reasonable to address the relay aging issue and prevent recurrence. The inspectors independently confirmed that the licensee had taken appropriate actions to identify and replace all Agastat relays currently in service. In addition, the inspectors verified that the licensee adequately performed surveillance testing to monitor the performance of in service Agastat relays to promptly identify and correct any conditions adverse to quality. Also, the inspectors identified no adverse performance trend data for the Agastat relays that would indicate degraded relay reliability. The inspectors reviewed the licensee's corrective actions to implement a vendor recommended preventive maintenance task to replace all Agastat relays installed in safety related applications at the frequency of 10 years from date of relay manufacture. Upon further review, the inspectors identified that the warehouse shelf life of the relay was not incorporated into the 10 year replacement PM task scheduling. The licensee entered this condition into their corrective action program (IR 1159574) and provided an initial technical justification for the operability of the Agastat relays currently in service.

.7 Semi-Annual Review to Identify Trends (1 sample)

a. Inspection Scope

The inspectors performed a semi-annual review of site 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 for July through December 2010, 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, overall, corrective actions to address configuration control performance deficiencies from the first half of 2010 were effective. The number and potential safety significance of configuration control related deficiencies identified in the second half of 2010 were notably reduced from the first half of 2010. Additionally, in response to recurring in-service testing (IST) deficiencies TMI completed a focused area self assessment (FASA) on implementation of the TMI IST program. The FASA was staffed by independent contractors and program experts from other licensees. The completed FASA was in-depth, identified numerous longstanding IST deficiencies, and initiated reasonable corrective actions to address each identified discrepancy (IRs 1113844, 1129854).

Additionally, the inspectors identified an emerging trend of instances where station personnel did not perform appropriate preventive maintenance (PM) for critical plant equipment as recommended by the vendor, industry operating experience, or TMI

operating history. Examples included no replacement PM for an Action Pack signal converter leading to a turbine trip (see Section 1R12, IR 1115086); no PM to periodically (every 6 years) clean the EDG fuel injector drain lines led to an inoperable EDG (see Section 4OA7, IR 1064102); using safety related Agastat 7000 series relays beyond the vendor recommended service life (see Section 4OA2.5, IR 1159574); no PM to periodically clean and inspect river water pump discharge vacuum break check valves despite indication of sticking on multiple valves (IR 1130386); and not periodically reforming spare stock electrolytic capacitors as recommended by industry guidance (IR 1096928). Station management acknowledged the issues and verified they were captured in the corrective action program.

The inspectors also observed an increased amount of transient material not properly secured or controlled in seismic class one buildings. The issue was previously documented in NRC inspection report No. 05000289/2010004. TMI nuclear oversight personnel identified the same issue. The inspectors discussed their observations with station management and verified the issue was entered in the TMI corrective action program.

.8 Radiation Safety (71153, 71124.01, 71124.02, 71124.03, 71124.04, 71124.05)

a. Inspection Scope

The inspectors selectively reviewed corrective action documents to determine if identified problems were entered into the corrective action program for resolution and to evaluate Exelon's threshold for entering issues into the program. The review included a check of possible repetitive issues, such as radiation worker or radiation protection technician errors. Also selectively reviewed were recent audits and assessments and corrective action program documents. The review was against the criteria contained in 10 CFR 20, Technical Specifications, and station procedures. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA3 Event Follow-up (71153 – 2 samples)

.1 Review of Licensee Event Reports (LERs) (1 sample)

(Closed) LER 05000412/2009-001-01 Multiple Main Steam Safety Valve Test Failures.

The LER discussed the cause and corrective actions in response to the 'as-found' pressure set-point test failures of multiple main steam safety valves in October 2009. No new issues were identified. The inspectors reviewed the updated LER and no findings of significance were identified and no violation of NRC requirements occurred. This LER is closed.

.2 Makeup Pump Recirculation Line Leak

a. Inspection Scope

At 1:30 a.m. on November 23, operators identified a small leak (10 drops per minute) from the makeup pump two inch recirculation line which is common to all three makeup pumps. The leak was from a degraded weld at a 90 degree pipe elbow. Station personnel visually monitored the leak for further degradation, installed a video camera to support remote monitoring, verified the leakrate remained below TS reactor coolant system leakage limits, and developed a repair plan. Engineers developed ECR 10-00676, Temporary Leak Repair on Makeup System Two Inch Elbow Socket Weld, Rev. 0. The inspectors reviewed ECR 10-00676 and verified the repair plan met the criteria specified in American Society of Mechanical Engineers Boiler and Pressure Vessel Code Case N-523-2, Mechanical Clamping Devices for Class 2 and 3 Piping, Section XI, Division 1. Maintenance personnel properly implemented the temporary repair on December 2. The inspectors visually inspected the leaking weld, reviewed applicable station drawings, procedures, and records, interviewed station personnel, and monitored operator actions to assess licensee response to the leak and verify the plant continued to be operated safely from the time the leak was discovered until the leak was repaired.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 7, 2011, the resident inspectors presented the inspection results to Mr. William Noll and other members of the TMI staff who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violations

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

Technical specification 6.8.1 requires that written procedures shall be established, implemented and maintained as recommended by Regulatory Guide 1.33, Revision 2. Specifically, procedure MA-AA-716-210, Performance Centered Maintenance (PCM) Process, Rev. 10, establishes guidance that the licensee identifies and implements new PM tasks within 18 months. Contrary to the above, the licensee failed to identify and implement a PM task to clean and inspect the Emergency Diesel Generator's (EDG) fuel oil drain lines in 2007 in accordance with their procedure. Consequently, the 'A' EDG (EG-Y-1A) fuel oil drain lines clogged and caused excessive fuel oil leakage from the fuel oil injector pumps. Operators identified this degraded condition during PMT following unrelated maintenance on EG-Y-1A. The fuel oil leak resulted in operators declaring EG-Y-1A inoperable on April 30 and May 1, 2010. This finding was more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and affected the availability of EG-Y-1A to respond to an initiating event to prevent undesirable consequences. The licensee entered the condition into their corrective action program (IR 1064102) and took immediate

corrective actions to address affected clogged drain lines on EG-Y-1A. In addition, the licensee initiated corrective actions to perform the PM task during the next scheduled maintenance outage for all onsite EDGs and to implement the PM task on the recommended frequency.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Atherholt	Manager, Regulatory Assurance
P. Bennett	Engineering Manager
R. Campbell	Manager, Work Management
W. Carsky	Director, Site Engineering
G. Chevalier	Senior Chemist
D. Divittore	Manager, Site Radiation Protection
D. Etheridge	Radiation Protection Technical Support
M. Fitzwater	Senior Regulatory Engineer
M. Hardy	System Engineer-Flood Protection
C. Incorvati	Director, Maintenance
J. Karkoska	Manager, Site Security
W. Noll	Site Vice President
A. Krause	Component Monitoring Engineer
R. Libra	Plant Manager
W. McSorley	Senior Staff Engineer, Procedures and Flood Protection
D. Neff	Manager, Emergency Preparedness
W. Noll	Site Vice President
J. Piazza	Senior Manager, Engineering
J. Popielarski	Manager, NOS
M. Reed	TDEFW System Engineer
C. Rich	Director, Operations
K. Robles	System Engineer
T. Vanwyen	Director, Site Training
S. Wilkerson	Manager, Engineering Design
L. Weber	Senior Chemist
M. Wyatt	Manager, Operations Training

Other

D. Dyckman	Nuclear Safety Specialist Pennsylvania Department of Environmental Protection Bureau of Radiation Protection

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

05000289/2010009-04	URI	Potential Concern Regarding TMI's Internal and External Flood Protection Barriers and Mitigation Strategies (Section 4OA2.2)
05000259/2009001-02	LER	Multiple Main Steam Safety Valve Test Failures (Section 4OA3.1)

Opened and Closed

05000289/2010005-01	FIN	Inadequate Preventive Maintenance for Signal Converter Causes Turbine Trip and Plant Transient (Section 1R12)
05000289/2010005-02	NCV	Deficient Internal and External Flood Barrier Inspection Program (Section 4OA2.2)

LIST OF DOCUMENTS REVIEWED

Section **1R01: Adverse Weather Protection**
Procedures
1104-46, Electric Heat Tracing, Rev. 58

Other
IRs: 1118777, 1118786, 1137063, 1139465, 1139812, 1141245, 1142328, 1142361

Section 1R04: Equipment Alignment
Procedures
1107-2A, Emergency Electrical – 4KV and 480V, Rev. 20
OP-TM-211-000, Makeup and Purification System, Rev. 20
OP-TM-211-131, Shift MU System From Low Temperature Overpressure to ES Standby Mode, Rev. 1
OP-TM-212-000, Decay Heat Removal System, Rev. 11
OP-TM-533-000, Decay Heat River System, Rev. 10
OP-TM-543-000 Decay Heat Closed System, Rev. 8

Drawings
E-206-022, One Line and Relay Diagram 4160V Engineered Safeguard Switchgear, Rev. 21
302-111, Reactor Building Normal and Emergency Cooling Water System, Rev. 13
302-202, Nuclear Services River Water Systems, Rev. 77
302-640, Decay Heat Removal Flow Diagram, Rev. 82
302-641, Decay Heat Removal Pumps 1A/1B Auxiliary Systems, Rev. 6
302-645, Decay Heat Closed Cycle Cooling Water, Rev. 39
302-660, Makeup & Purification Flow Diagram, Rev. 44
302-661, Makeup & Purification Flow Diagram, Rev. 59
302-662, Makeup & Purification Pump, Auxiliary Systems, Rev. 0

Other
10 CFR 50.59 Screened-out Evaluations

Section 1R05: Fire Protection
Procedures
1038, Fire Protection Program, Rev. 76
OP-MA-201-007, Fire Protection System Impairment Control, Rev. 6
OP-TM-AOP-001, Fire, Rev. 8
OP-TM-AOP-0010-A06, Fire in AB 305' Demineralizer and 1A ESV MCC Area, Rev. 3
OP-TM-AOP-0011-A06, Fire in AB 305' Demineralizer and 1A ESV MCC Area Basis Document, Rev. 5

Drawings
302-231, Fire Service Water Flow Diagram, Sheet 1, Rev. 107
302-231, Fire Service Water Flow Diagram, Sheet 2, Rev. 16
1-FHA-026, Fire Area Layout Auxiliary and Fuel Handling Buildings, Rev. 14
1-FHA-027, Fire Area Layout Auxiliary and Fuel Handling Buildings, Rev. 8

Other
TMI Unit 1 Fire Hazards Analysis Report, Rev. 23
TMI Unit 1 Fire Pre-Plan & Strategies dated July 12, 2010
WO: C2023995

Section 1R07: Heat Sink Performance
Procedures
1104-19, Control Building Ventilation, Rev. 77
ER-TM-340-1002, Guidance for Heat Exchanger Inspections and Cleaning at TMI, Rev. 2
E-108.1, Periodic Inspection and Test of AH-C-4A and AH-C-4B, Rev. 1
E-108.3, Cleaning and Inspection of AH-C-4A and AH-C-4B, Rev. 2
ER-TM-340-1001, TMI Generic Letter 89-13 Program Basis Document, Rev. 0

Other
EPRI NP-7552, Heat Exchanger Performance Monitoring Guidelines, Rev. 12/91
TR 119, Generic Letter 89-13 Program Description, Rev. 5
WOs (R2137684, R2168767, R2168875)
IRs: 948542, 1157113

Section 1R11: Licensed Operator Requalification
Procedures
EP-AA-112-100-F-01, Shift Emergency Director Checklist, Rev. L
EP-AA-1009, Radiological Emergency Plan Annex for the Three Mile Island (TMI) Station, Rev. 16
OP-TM-AOP-050, Reactor Coolant Leakage, Rev. 1
OP-TM-EOP-001, Reactor Trip, Rev. 10
OP-TM-EOP-002, Loss of 25 F Subcooling Margin, Rev. 8
OP-TM-EOP-005, Once Through Steam Generator Tube Leakage, Rev. 7
OP-TM-EOP-010, Emergency Procedure Rules, Guides, and Graphs, Rev. 11
OP-TM-211-910, Emergency Injection (HPI/LPI), Rev. 5
OP-TM-534-901, RB Emergency Cooling Operations, Rev. 10

Section 1R12: Maintenance Effectiveness
Procedures
MA-AA-716-210, Performance Centered Maintenance Process, Rev. 3 & 10
MA-AA-716-210-1001, Performance Centered Maintenance (PCM) Templates, Rev. 9
MA-TM-135-650, Inspect Rubber Expansion Joints, Rev. 4.

Other
IRs: 320094, 941354, 1063957, 1064102, 1134117, 1134139, 1134197
ARs: A2262877, A2262878, A2262957
WOs: C2017604, R2122025, R2125443
Fairbanks Morse Fuel Injector Pump Repair Report, dated 10/25/2010
Fairbanks Morse PCM Template, Rev. 2, 3 & 4

Section 1R13: Maintenance Risk
Procedures
WC-AA-101, On-Line Work Control Process, Rev. 17A

Other
IRs: 1133876; 1137809

Section 1R15: Operability Evaluations
Procedures
ER-AA-520, Instrument Performance Trending, Rev. 3
OPE-10-005, Decay Heat River Water A Train, Rev. 2
OP-TM-534-000, Reactor Building Emergency Cooling Water System, Rev. 1
OP-TM-534-207, In-Service Test of RR-V-3A/B/C and RR-V-4A/B/C/D, Rev. 0a
OP-TM-AOP-004, Tornado/High Winds, Rev. 1
OP 1302-5.17, Make-Up Tank Level & Pressure Instrumentation, Rev. 27

Drawings
101310, Geophysical Investigation Findings Manhole E6, Rev. A

Other
OTDM, Resolution plan for Secondary River Pipe Leak, Rev. 1
Secondary River Water ACMP, Rev. 2
WO C2024437; 2115356; 2146472;
IRs:

797990	939840	1019810	1123190	1131628
798088	940189	1115315	1123194	
816117	1016636	1115334	1132900	

Section IR19: Post Maintenance Testing
Procedures
MA-AA-716-100, Maintenance Alterations Process, Rev. 11
MA-AA-723-300, Diagnostic Testing of Motor Operated Valves, Rev. 4
MA-AA-723-300-1004, Quiklook Diagnostic, Rev. 2
OP-TM-534-207, IST of RR-V-3A/B/C and RR-V-4A/B/C/D, Rev. 0
OP-TM-541-201, IST of NSRW Pumps and Valves, Rev. 7

Drawings
302-202, Nuclear Services River Water System, Rev. 77

Other
IST Evaluation # 205, NR-P-1A, Rev. 0
IRs: 1133761, 1136511
Work Orders: C2010717, R2112618; C2023915

Section IR22: Surveillance Testing
Procedures
OP-TM-214-000, Building Spray System, Rev. 8
OP-TM-214-202, IST of BS-P-1B and Valves, Rev. 11, Performed 10/15/10
OP-TM-301-302, Turbine Valve Full Stroke Test, Rev. 7, Performed 12/4/10

Drawings
209-481, ES Actual 'A' HP INJ & Loading Seq Chan RC1A, Rev. 13
302-011, Main Steam Flow Diagram, Rev. 72
302-712, Reactor Building Spray Flow Diagram, Rev. 49

Other
WOs: R2165963, R2168714

IRs: 1148443, 1148452, 1152443, 1152756, 1154074, 1154135
ARs: A2266729

Section 1EP6: Drill Evaluation

Procedures

EP-AA-112-100-F-01, Shift Emergency Director Checklist, Rev. L
EP-AA-1009, Radiological Emergency Plan Annex for the Three Mile Island (TMI) Station, Rev. 16
OP-TM-AOP-020, Loss of Station Power, Rev. 13
OP-TM-AOP-043, Loss of Pressurizer (Solid Operation Cooldown), Rev. 2
OP-TM-AOP-064, Uncontrolled Rod Motion, Rev. 1
OP-TM-EOP-001, Reactor Trip, Rev. 10
OP-TM-EOP-002, Loss of 25 F Subcooling Margin, Rev. 8
OP-TM-EOP-006, Loss of Coolant Accident Cooldown, Rev. 7
OP-TM-EOP-010, Emergency Procedure Rules, Guides, and Graphs, Rev. 11

Section RS01: Access Control to Radiologically Significant Areas

Procedures

NF-AA-390, Rev. 4, Spent Fuel Pool Material Control
RP-AA-460, Rev. 20, Controls for High and Locked High Radiation Areas
RP-AA-460-001, Rev.2, Control for Very High Radiation Areas
RP-AA-460-002, Rev. 0, Additional High Radiation Exposure Control
RP-TM-460-1002, Rev.1, Access Control for Locked High Radiation Areas
RP-TM-460-1003, Rev. 1, Access to Reactor Incore Undervessel Area
RP-TM-460-1007, Rev.5, Access to TMI 1 Reactor Building
RP-TM-460-1008, Rev. 2, Locked High Radiation Area Key Control
RP-TM-460-1011, Rev.0, Establishment of Robust Barriers for Irradiated Fuel Movement

Documents

Instrument Calibration Records (SAM NOs. 714543, PCM1-710938, PCM2-714558, PM-7 714502)
Radioactive Source Records
Source Reconciliation Report and leak test data
General Source Term Data
Locked High Radiation Key Inventory

Section RS02: Occupational ALARA Planning and Controls

Documents

General Source Term Data
ALARA Post-Job Reviews
Work In Progress Reviews
Radiation Work Permits and associated ALARA plans and post-job reviews (409, 509, 534, 601, 602, 605, 609, 621)

Section RS03: In-Plant Airborne Radioactivity Control and Mitigation

Documents

Issue Reports
General Source Term Data

Section RS04: Occupational Dose Assessment

Procedures

RP-AA-203-1001, Rev. 6, Personnel Exposure Investigations

Documents

Personnel Exposure Investigations
Part 61 Scaling factors
Exposure Control and Dose Records
General Source Term data

Section RS05: Radiation Monitoring Instrumentation

Procedures

RP-TM-716, Rev.0, Performance of Smear Testing of Automated Contamination Monitors
RP-TM-717, Rev.0, Smear Testing for Automated Contamination Monitors

Documents

General Source Term Data
Instrument Smear Test Data
Contamination Monitoring Instrument Matrix

Section 4OA1: Performance Indicator (PI) Verification

Procedures

LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Rev. 13
LS-AA-2200, Mitigating System Performance Index Data Acquisition & Reporting, Rev. 3
OP-TM-541-432, Backwashing NS-C-1A, Rev. 4
1301-3, Reactor Coolant System Chemistry and Activity, Rev. 30

Drawings

302-202, Nuclear Services River Water Systems, Rev. 77

Other

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 6
Annual Radiological Environmental Effluent Release Reports - 2009
Corrective Action Documents (ARs)
Monthly Surveillance data
Ground water well data
TMI-2006-004, MSPI Basis Document, Rev. 2
IRs:

972577	1004908	1029252	1063957	1070603	1154989
984116	1008698	1041841	1064102	1093770	

Section 4OA2: Identification and Resolution of Problems

Procedures

CC-AA-201, Plant Barrier Control Program, Rev. 8
E-126, Water Intrusion Seal Inspection, Rev. 5
M-159, Steam Driven Emergency Feed Pump Turbine and Governor Inspection (EF-U-1), Rev. 12
MA-AA-716-009, Preventive Maintenance Word Order Process, Rev. 5
MA-AA-716-210, Performance Centered Maintenance (PCM) Process, Rev. 10
MA-AA-716-210-1001, Performance Centered Maintenance (PCM) Templates, Rev. 9
OP-TM-424-203, IST of EF-P-1 and Valves
OP-TM-AOP-002, Flood, Rev. 2A

PES-S-002, Shelf Life, Rev. 6
U-17, Zurn Floor Drain Inspection, Rev. 14
WC-AA-101, On-Line Work Control Process, Rev. 17
1301-8.2A, Diesel Generator Inspection (Electrical), Rev. 17

Other
Calculation C-1101-734-5350-003, Rev. 11
ECR TM-10-493, Air Intake Tunnel Flood Barriers, Rev. 2
ECR TM-10-480, Plug Air Intake Tunnel Drain Line, Rev. 0
ECR TM-10-545, External Flood Design Improvements, Rev. 0
Inventory Parts Catalog, Stock Code 200 59533, Agastat Time Delay Relay
MPR report, Auxiliary Feed Water System Industry Experience Review for the Exelon Fleet, dated 10/22/2004
MPR Associates Inc. LTR-0080-0903-02, Review of Internal Flooding Licensing and Design Bases for TMI Unit 1, Dated May 6, 2009
NOSA-TMI-09-06 (AR 939772), dated August 5, 2009
NOSA-TMI-10-04 (AR 1068816), dated June 25, 2010
Operating Experience Smart Sample, FY-2010-01, Recent Inspection Experience for Components Installed Beyond Vendor Recommended Service Life
Performance Centered Maintenance Template for Power Supplies and Inverters <5kVA; Rev. 1
Performance Centered Maintenance Template for Inverters > or = 5kVA; Rev. 1
Performance Centered Maintenance Template, Relays – Control/Timing, 1/21/2002
Performance Centered Maintenance Template for Relays – Control / Timing; Rev. 0
Performance Centered Maintenance Template for Relays – Protective; Rev. 0
RP Comprehensive Assessment Plan
Tech Evaluation ACIT 1104245-17, Evaluate Whether Air Intake Tunnel (AIT) Deluge Sump Pump (SD-P-7) Will Prevent flooding of AIT and Other Flood Protected Areas, Rev. 0
TMI IPEEE, Table 2, Potential Flood Impacts on Key Systems
Topical Report no. 170, Maintenance Rule Structures in-Scope Inspection Report for Air intake Tunnel and Pagoda, Rev. 1

IRs:

939772	990149	1027553	1083766	1119907
984492	991379	1060668	1094987	1128613
987091	991759	1063662	1096949	1135576
987416	993710	1068816	1097783	1109509
989593	1025739	1073958	1108014	

IRs:

0194952	0642492	1091213	1095333	1104952	1114939
0566501	0677235	1094422	1101014	1105193	1114958
0588565	0881153	1094432	1102568	1109230	
0607082	1014746	1094440	1103030	1109534	
0635450	1086844	1094441	1104245	1109631	

WOs: R1725341, R1727509, R1831528, R2130766, R 2130826, R2134971, R2144761, R2141932, R2207102, R2238446

Section 4OA3: Event Follow-up

Drawings
302-660, Make-Up and Purification, Rev. 44

302-661, Make-Up and Purification, Rev. 59
C-9459-01-FS-MU-57, Recirculation Line for Make-Up & Purification MU 1A/B/C, Rev. 14

Procedures
MA-AA-716-210, Performance Centered Maintenance Process, Rev. 3 & 10
Fairbanks Morse Fuel Injector Pump Repair Report, dated 10/25/2010
Fairbanks Morse PCM Template, Rev. 2, 3 & 4

Other
Operability Evaluation 10-007, Make-Up Pump Recirculation Line Between MU-V-37 and the Seal Return Line, Rev. 0
Work Order A2106087, Technical Evaluation of Furmanite Clamp Design for Leaking Socket Weld on the Outlet of MU-V-37
ARs: A2262957, A2262877, A2262878
IRs: 941354, 982522, 984026, 1063957, 1064102, 1134117, 1134139, 1134197, 1143917
WOs: C2017604, R2122025, R2125443

LIST OF ACRONYMS

AB	Auxiliary Building
ADAMS	Agencywide Documents and Management System
AIT	Air Intake Tunnel
ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
DRP	Division of Reactor Projects
DTCS	Digital Turbine Control System
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
ENS	Emergency Notification System
ESAS	Engineered Safeguards Actuation System
FASA	Focused Area Self Assessment
GPM	Gallons Per Minute
HRA	High Radiation Area
ICS	Integrated Control System
IMC	Inspection Manual Chapter
IR	Issue Report
IST	Inservice Testing
LER	Licensee Event Report
LOR	Licensed Operator Requalification
MR	Maintenance Rule
MSPI	Mitigating Systems Performance Indicators
MTBF	Mean Time Between Failures
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NSRW	Nuclear Service River Water
NVLAP	National Laboratory Accreditation Program
ODCM	Offsite Dose Calculation Manual
OE	Operating Experience
PADEP	Pennsylvania Department of Environmental Protection
PARS	Publicly Available Records
PCM	Performance Centered Maintenance
PI	Performance Indicators
PI&R	Problem Identification and Resolution
PM	Preventive Maintenance
PMT	Post Maintenance Testing
RCA	Radiological Controlled Area
RCE	Root Cause Evaluation
RETS	Radiological Effluents Technical Specification
RS	Radiation Safety
SDP	Significance Determination Process
SSC	Structures, Systems, and Components
SSFF	Safety System Functional Failures
TDEFW	Turbine Driven Emergency Feedwater Pump

TMI	Three Mile Island, Unit 1
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VHRA	Very High Radiation Area