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

May 1, 2012

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

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 – NRC INTEGRATED INSPECTION REPORT 05000289/2012002

Dear Mr. Pacilio:

On March 31, 2012, 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 April 13, 2012, with Mr. Rick Libra, Site Vice President, and other members of your staff.

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

This report documents three NRC-identified and one self-revealing findings of very low safety significance (Green). Three of these findings were determined to involve violations 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 these violations as NCVs, consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Three Mile Island Nuclear Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Three Mile Island Nuclear Station.

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).

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000289/2012002
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

Docket No:	50-289
License No:	DPR-50
Report No:	05000289/2012002
Licensee:	Exelon Generation Company
Facility:	Three Mile Island Nuclear Station, Unit 1
Location:	Middletown, PA 17057
Dates:	January 1, 2012 through March 31, 2012
Inspectors:	D. Werkheiser, Senior Resident Inspector J. Heinly, Resident Inspector C. Cahill, Senior Reactor Analyst B. Cook, Senior Reactor Analyst C. Crisden, Emergency Preparedness Inspector D. Everhart, Emergency Preparedness Inspector T. O'Hara, Reactor Inspector M. Orr, Reactor Inspector T. Moslak, Senior Health Physicist D. Everhart, Physical Security Inspector
Approved by:	G. Hunegs, Chief Reactor Projects Branch 6 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000289/2012002; 01/01/2012-03/31/2012; Three Mile Island, Unit 1; Equipment Alignment, Inservice Inspection Activities, Maintenance Effectiveness, and Maintenance Risk Assessments and Emergent Work Control.

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

Cornerstone: Initiating Event

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, because Exelon did not specify, in writing, the exact inspection scope and criteria for boric acid inspections of the reactor coolant pump bolted flanges during plant refueling outages. Lack of specific procedural guidance contributed to the failure to detect reactor coolant system leakage from the thermal barrier flange of the 'B' reactor coolant pump (RC-P-1B) prior to November 2011. Exelon's failure to ensure that both the upper and lower RCP thermal barrier flanges were visually inspected for the complete 360 degrees for all RCPs is a performance deficiency within Exelon's ability to foresee and prevent. Exelon completed a boric acid evaluation which showed there was reasonable assurance that the flange could safely operate until the next refueling outage. Additionally, Exelon prepared an adverse condition monitoring plan and is performing periodic remote monitoring of the affected flange for changes in leakage from the degraded gasket. Exelon entered this issue into the corrective action program as IR 01344561.

  The finding is more than minor because it is associated with the Equipment Performance attribute (a degraded RCP flange gasket) of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Also, this finding is similar to the more than minor example 4.a in Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E. The inspectors completed IMC 0609.04, "Phase 1- Initial Screening and Characterization of Findings," and screened the finding as very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Work Control, because Exelon did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported [H.4(c)]. (Section 1R08)

- Green. A self-revealing finding was identified for inadequate performance monitoring of instrument air compressor number four (IA-P-4) in accordance with ER-AA-2003, System Performance Monitoring and Analysis. Specifically, performance monitoring action levels established for loaded and unloaded times in procedure 1104-25, "Instrument and Control Air System," were not adequate to identify the adverse trend in performance and resulted in

recurring drive-motor overload trips and unplanned accrued unavailability of IA-P-4 on September 28, October 8 and November 29, 2011. Maintenance technicians repaired the air leaks and subsequent IA-P-4 air loading decreased. Corrective actions were implemented to trend loaded and unloaded times of IA-P-4 in the system monitoring plan and implement acoustic monitoring for identification of system air leakage (IR 1295235).

This finding is more than minor because it was associated with the equipment performance attribute of the initiating events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. In accordance with Inspection Manual Chapter 0609.04, "Phase 1 - Initial Screen and Characterization of Findings," the inspectors conducted a phase 1 SDP screening and determined that a detailed phase 2 evaluation was required to assess the safety significance because the finding contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment would not be available. The inspectors consulted a senior risk analyst (SRA) to perform a detailed phase 2 analysis. The SRA performed a bounding risk analysis using five days of IA-P-4 unavailability. The phase 2 analysis concluded that the significance of the finding was of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to thoroughly evaluate the cause of the IA-P-4 trips such that the resolution addressed the cause [P.1(c)]. (Section 1R12)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of license condition DPR-50 section 2.C.(4), Fire Protection, for Exelon's failure to implement compensatory actions during planned maintenance on the 'A' nuclear service heat exchanger (NS-C-1A). Specifically, on May 10, 2010, Exelon failed to return Appendix R breakers to their correct position within the seven day allowed outage time and implement compensatory actions in accordance with administrative procedure (AP) 1038, Fire Protection Program. The inspectors determined Exelon's failure to implement compensatory actions during planned maintenance on NS-C-1A in accordance with AP 1038 was a performance deficiency that was within Exelon's ability to foresee and correct. Exelon performed an extent of condition review and created a requirement to review the fire hazard analysis report for applicability before removing equipment from service. Exelon has entered this issue in the corrective action program for resolution as IR 1347403.

  This finding is more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with Inspection Manual Chapter 0609.04, "Phase 1 – Initial Screen and Characterization of Findings," the inspectors conducted a phase 1 SDP screening using Appendix F, Fire Protection Significance Determination Process, and determined that a detailed phase 2 analysis was required due to the elevated calculated delta core damage frequency. The inspectors performed a detailed walkdown of the control cables associated with the nuclear river system valves and identified no fire ignition sources and concluded that the finding was very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Resources, because Exelon failed to ensure complete, accurate, and up-to-date procedures were used to determine if compensatory actions were required for planned work activities [H.2(c)]. (Section 1R04)

- Green. The inspectors identified a non-cited violation of 10 CFR 50.65 (a)(4), Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, for Exelon's failure to adequately assess and manage the impact to plant risk during a planned maintenance activity. Specifically, Exelon did not recognize an elevated online maintenance risk activity and implement appropriate risk management actions (RMAs) during maintenance on the decay heat removal (DHR) drop line valve (DH-V-3) on January 16, 2012. The inspectors determined that the failure to perform an adequate risk assessment and implement appropriate RMA's for the planned maintenance on DH-V-3 is a performance deficiency that was within Exelon's ability to foresee and correct. Immediate corrective actions included operator and work planning training on risk evaluations and an extent of condition review to ensure planned maintenance activities that could impact DHR system operability were identified. Exelon entered this issue into the corrective action program for resolution as IR 1314551.

  This finding was determined to be more than minor since it is similar to more than minor example 7.e of Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E because the risk assessment, when adequately performed, resulted in an elevated station risk condition and required RMAs. The finding was evaluated in accordance with Appendix K, Maintenance Risk Assessment and Risk Management Significance Determination Process, of IMC 0609, "Significance Determination Process". The inspectors, in consultation with a senior risk analyst, performed a phase 1 analysis and concluded that the incremental core damage probability deficit for DH-V-3 with an out-of-service time of 8 hours was less than 1E-6. Therefore, the finding was determined to be of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Work Control, because Exelon failed to incorporate appropriate risk insights into the planning and execution of the DH-V-3 maintenance activity [H.3(a)]. (Section 1R13)

Other Findings

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

REPORT DETAILS

Summary of Plant Status

Three Mile Island, Unit 1 (TMI) operated at approximately 100 percent rated thermal power for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 External Flooding

a. Inspection Scope

During the week of March 12, 2012, the inspectors performed an inspection of the external flood protection measures. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), Section 2.6, which depicted the design flood levels and protection areas containing safety-related equipment to identify areas that may be affected by external flooding. The inspectors reviewed the most recent station surveillance of the flood dike and also performed a walk down to determine the condition of the flood barrier. In addition, the inspectors performed a smart sample walk down of key flood protection barriers, including the intake screen house to ensure that Exelon erected flood protection measures in accordance with design specifications. The inspectors also reviewed operating procedures for mitigating external flooding during severe weather to determine if Exelon planned or established adequate measures to protect against flooding events.

b. Findings

No findings were identified.

.2 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

On March 8 and 9, 2012, the inspectors performed an inspection of the offsite power availability during a solar magnetic disturbance warning. The inspectors reviewed Exelon's operating procedures, interviewed operators and engineering staff and performed field walkdowns to validate the condition of offsite power and station transformers. Specifically, the inspectors assessed whether Exelon established and implemented appropriate procedures and protocols to monitor and maintain availability and reliability of both the offsite alternating current (AC) power system and site auxiliary transformers during the solar magnetic disturbance.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

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

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'A' decay river system on January 19, 2012
- Make-up and letdown on February 3 through February 4, 2012
- Auxiliary and intermediate building ventilation on March 1 through March 2, 2012
- 'B' & 'C' nuclear service closed-cooling during 'A' cooler maintenance on March 12, 2012

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

b. Findings

Introduction. The inspectors identified a Green non-cited violation (NCV) of license condition DPR-50 section 2.C.(4), Fire Protection, for Exelon's failure to implement compensatory actions during planned maintenance on the 'A' nuclear service heat exchanger (NS-C-1A). Specifically, on May 10, 2010, Exelon failed to return Appendix R breakers to their correct position within the seven day allowed outage time (AOT) and implement compensatory actions in accordance with AP 1038, Administrative Controls – Fire Protection Program.

Description. TMI has four nuclear service heat exchangers that provide cooling to essential plant systems and components. Nuclear river water flows through the heat exchangers and provides cooling to the nuclear service closed cooling water. The fire hazard analysis report (FHAR) requires that the in-service cooler, normally NS-C-1A, shall have its nuclear river water inlet and outlet valves open to the heat exchanger and the valve operator breakers in the off position. This configuration is maintained to protect the system from spurious valve closure and loss of cooling in a fire condition. TMI's FHAR assumes one heat exchanger in this configuration to meet Appendix R requirements and ensure cooling to the 'B' make-up pump in a postulated fire condition.

On March 11, 2012, Exelon removed NS-C-1A from service to perform planned cleaning and inspection of the heat exchanger. On March 12, 2012, the inspectors identified that

the heat exchanger in service did not have its nuclear river water inlet and outlet valve breakers in the off position as required to meet Appendix R requirements. TMI's fire protection program procedure, AP 1038, requires that the station enter a seven day AOT for the incorrectly positioned Appendix R breakers. The inspectors identified that Exelon had not identified nor taken this action. After the inspectors notified Exelon, the station appropriately entered the AOT and restored the FHAR required alignment of the in-service heat exchanger and exited the time clock on March 12, 2012. The inspectors determined this issue to be a minor violation because the out of service time was less than seven days. Exelon documented this issue in their corrective action program (CAP) as IR 1339730.

On March 28, 2012, the inspectors completed an extent of condition review from the issues identified on March 12, 2012 and identified that NS-C-1A was removed from service for 10 days from May 3 to May 13, 2010 and that Exelon had not entered the seven day AOT in accordance with AP 1038. In addition, AP 1038 requires the development and implementation of compensatory actions if the AOT is exceeded; this action was not implemented. Exelon performed an extent of condition review and created a requirement to review the FHAR for applicability before removing equipment from service. Exelon documented this issue in their CAP as IR 1347403.

Analysis. The inspectors determined Exelon's failure to implement compensatory actions during planned maintenance on NS-C-1A, in accordance with AP 1038, was a performance deficiency that was within Exelon's ability to foresee and correct. This finding is more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

In accordance with Inspection Manual Chapter (IMC) 0609.04, "Phase 1 – Initial Screen and Characterization of Findings," the inspectors determined the finding affected the fire protection defense-in-depth strategy involving post fire safe shutdown systems. Therefore, the inspectors conducted a phase 1 SDP screening using IMC 0609, Appendix F, "Fire Protection Significance Determination Process," and based on the finding having a moderate degradation rating and affecting more than the ability to achieve and maintain cold shutdown, an initial qualitative screening per step 1.4 was conducted. The out-of-service time of 10 days resulted in a duration factor of 0.1 and the areas affected (auxiliary building, cable spreading, radiation waste, and switchgear areas) resulted in a generic fire frequency of 7.2E-2. The inspectors determined a phase 2 analysis was required. The inspector performed a detailed walk down of the affected areas, including control cables associated with the nuclear river system valves, and identified no fire ignition sources. This results in no potentially challenging fire scenarios for a phase 2 review (task 2.3.5) which screens the finding as very low safety significance, (Green).

This finding has a cross-cutting aspect in the area of Human Performance, Resources, because Exelon failed to ensure complete, accurate, and up-to-date procedures were used to determine if compensatory actions were required for planned work activities. [H.2(c)]

Enforcement. License condition 2.C.(4), "Fire Protection," requires that Exelon implement and maintain in effect all provisions of the approved fire protection program

as described in the UFSAR. The UFSAR identifies AP 1038 as part of the implementing procedure for the fire protection program. AP 1038 outlines and describes the organization, responsibilities, quality assurance, maintenance, inspection, testing, and training associated with fire protection program functions. AP 1038 requires, in part, that out-of-position Appendix 'R' component breakers be repositioned within seven days or compensatory actions are implemented. Contrary to the above, from May 3 to May 13, 2010 Exelon failed to return the nuclear river water Appendix 'R' breakers to their correct position within seven days and implement compensatory actions in accordance with AP 1038. Exelon performed an extent of condition review and created a requirement to review the FHAR for applicability before removing equipment from service. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program under IR 1347403, this violation is being treated as an NCV, consistent with the Enforcement Policy. (**NCV 05000289/2012002-01, Failure to Implement Compensatory Actions for Out-of-Service Appendix 'R' Heat Exchanger**)

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

a. Inspection Scope

On March 9 and 12, 2012, the inspectors performed a complete system walkdown of accessible portions of the 'A' makeup system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related issue reports and work orders to ensure Exelon appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 4 samples)

a. Inspection Scope

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

station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Auxiliary building 271' elevation heat exchanger area on January 12, 2012
- Auxiliary building 305' elevation 'B' motor-control center engineered safeguards valve area on February 13, 2012
- Control building 338'6" elevation 1E switchgear on March 30, 2012
- Control building 355' elevation control room area on March 15, 2012

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes on March 27-28, 2012, subject to flooding that contain cables whose failure could disable risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including cable vaults E-14 and E-10 containing safety-related power and control cables, to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. When applicable, the inspectors verified proper sump pump operation and verified level alarm circuits were set in accordance with station procedures and calculations to ensure that the cables will not be submerged. The inspectors also ensured that drainage was provided and functioning properly in areas where dewatering devices were not installed.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the nuclear service closed cooling water 1C heat exchanger inspection performed under ER-TM-340-1002, "Guidance for Heat Exchanger Inspections and Cleaning at TMI," Revision 2, to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified Exelon's commitments to NRC Generic Letter 89-13. The inspectors reviewed the results of previous inspections of the nuclear service closed cooling water '1C' and similar heat exchangers. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors validated that chemical control of the piping and heat exchanger surfaces was effective in preserving the integrity of the components. The inspectors verified that Exelon initiated appropriate corrective actions for identified

deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

URI 05000289/2011005-01, Inspect and Disposition Leakage Event from 'B' Reactor Coolant Pump (RCP) Flange from 1R19

a. Inspection Scope

The inspectors reviewed the licensee's responses to questions originally documented in inspection report 05000289/2011005 as Unresolved Item (URI) 05000289/2011005-01**,** Inspect and Disposition Leakage Event from 'B' RCP Flange from 1R19.

The summary of each item and the licensee's responses are as follows:

(1) Determine whether commitments made by the licensee in response to Generic Letter 88-05 (part of the current licensing basis) have been completely and accurately carried forward when procedure OP-TM-220-261 replaced procedure 1303-8.1, Revision 31, in 2003.

Response: After review of this issue the licensee identified that some piping and valves had not been carried over to the new procedure, however, the identified piping and valves were being inspected under another plant program. This issue was documented in IR 1339037.

(2) Determine whether the inspection effectiveness (per 10 CFR 50, Appendix B, Criterion IX, Control of Special Processes and/or Criterion XI, Test Control) was evaluated when procedure 1303-8.1, Revision 31, was replaced by OP-TM-220-261, Revision 7 in 2003. Specific issues to assess are:

- Determine what change management process was completed in 2003 when Exelon transitioned to OP-TM-220-261, Revision 7 from 1303-8.1, Revision 31.

  Response: Exelon completed a 50.59 screening and evaluation which determined that the procedures did not affect the commitment. Exelon also reported the change in their 2007 50.59 summary update.

- Identify how Exelon determined that procedure OP-TM-220-261, Revision 7, performed at depressurized, cold shutdown conditions, will provide the same leak detection sensitivity as the original 1303-8.1, Revision 31, and which required reactor coolant system (RCS) pressure of 2155 psig, before and during the boric acid corrosion (BAC) inspections.

  Response: Exelon explained that this is not necessary. The boric acid program has no regulatory requirement in this area.

- Determine if the removal of the inspection target listings, which were originally contained in procedure 1303-8.1, Revision 31, and not incorporated into OP-TM-220-261, Revision 7, was evaluated by Exelon for the effect on test and leak detection sensitivity.

  Response The item was resolved via IR 1339037. The affected components were inspected as part of another plant monitoring program.

(3) Understand Exelon's justification that inspecting the RCP flanges at hot shutdown conditions (HSD) was unsafe or impractical. The inspectors noted that Exelon had routinely historically performed BAC inspections at HSD conditions in accordance with procedures 1303-8.1, Revision 31, and OP-TM-220-261, Revision 7, between 1988 and 2003. Also, Exelon currently conducts RCS pressure tests during plant startup at HSD conditions.

  Response: Exelon explained that their boric acid procedure did not require justification of not performing inspections due to unsafe or impractical conditions. Rather Exelon explained that their boric acid inspection program consists of (a) hot shutdown walkdown inspections, (b) cold shutdown (i.e. depressurized) inspections and (c) inspections done during plant operational pressure tests during plant startup.

(4) WCAP 15988NP is a self-imposed industry standard which Exelon has adopted. By using ER-AP-331-1001, Exelon does not appear to meet the following elements of the WCAP 15988NP: Key Element 1: Identification of Inspection Locations; Key Element 2: Obstructions to Visual Inspections; Key Element 7: Data Collection and Documentation; and Key Element 11: Continuous Improvement and Self-Assessment, as required by WCAP 15988NP.

  Response: Exelon explained that their boric acid inspection program, which includes inspection phases as described in (3) above, is based on a Technical Document Report (TDR) from 1989 which selected all boric acid leak sources which were susceptible to small leaks, which meets key Element 1. However, Exelon only documents, through IRs, inspections of components which actually show leakage. Thus, specific components inspections are documented only when leakage is identified. Also, Exelon's procedure requires that a corrective action report be written when obstructions to visual inspections are discovered which demonstrated compliance with Key Element 2. Exelon's practice of recording only identified boric acid leak location does meet the WCAP Key Element 7, Data Collection and Documentation, however, inspected components which do not show leakage are not recorded. Key Element 11: Continuous Improvement and Self-Assessment. Exelon does have a self assessment program and a System Health Report process for the boric acid program which meets the objective of Key Element 11.

The inspectors reviewed plant procedures 1303-8.1, TMI Unit 1, Reactor Coolant System Surveillance Procedure, Revision 31; OP-TM-220-261, Reactor Coolant System VT-2 Exam, Revision 7; recurring task work order R2112462, RCP Flange Inspections and several video records and data sheets from boric acid inspections of the RCP flanges from 2003 through 2011.

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V Instructions, Procedures, and Drawings, because Exelon did not specify, in writing, the exact inspection scope and criteria for inspectors to follow when inspecting the reactor coolant pump (RCP) bolted flanges during the conduct of boric acid corrosion control (BACC) inspections.

Description. Exelon did not provide specific technical guidance on the desired inspection scope and the criteria to be used to report results to ensure that the RCP thermal barrier flanges were visually inspected for the complete 360 degrees of both the upper and lower flanges of all four RCPs. Exelon's verbally stated objective, to inspect 360 degrees of each flange, had not been communicated to inspection personnel through appropriate instructions, procedures and drawings.

After plant cooldown, during the fall 2011 refueling outage, Exelon identified dried boric acid leakage residue (approximately 15 lbs. of dried boric acid) on the thermal barrier flanges of 'B' RCP (RC-P-1B). Several previous outage inspections had been unsuccessful in detecting this RCS mechanical leakage. A review of several video records, DVDs, and data sheets from boric acid inspections of the RCP flanges from 2003 through 2007, showed that a 360 degree view of the RCP flanges had not been accomplished by BAC inspections during that time period. These video records had been used to conduct the inspections. The video records from the 2009 refueling outage had been corrupted and were not viewable. The inspectors also noted that some boric acid leak indications had not been recorded for boric acid evaluation and resolution by level 2 or level 3 qualified visual examination (VT) inspectors. Results of the 2011 video data review had been recorded on VT data sheets and dispositioned by level 3 non-destructive examination (NDE) personnel, however, the 2011 video records, also did not show complete (360 degree) visual inspection of the RCP flanges. Because a complete 360 degree inspection was not completed and because not all indications had been recorded and dispositioned, the probability of detecting the leakage from RC-P-1B at smaller leakage rates had been reduced.

The lack of appropriate written procedural guidance and oversight contributed to the failure to detect the leakage from the thermal barrier flange of RC-P-1B before the 2011 outage. Without specific control over the inspection scope and without specific criteria on what conditions to report for resolution, the boric acid inspections were not as sensitive in detecting small leakage amounts. The incomplete inspection of the RCP flanges potentially subjected the plant to other leakage and did not limit the likelihood of those events (RCS leakage) that upset plant stability and challenge critical safety functions during shutdown as well as power operations. After investigation, Exelon attributed the leakage to a crushed gasket in the upper thermal barrier flange. The leakage had also resulted in degradation of one of the RCP flange's carbon steel holddown bolts. Earlier detection of the leakage with a more controlled inspection could potentially have avoided the damage to the flange bolt.

Exelon entered this condition into their CAP as IR 01344561 on March 22, 2012. RC-P-1B was returned to service, without repair of the gasket, after completion of a boric acid evaluation which showed there was reasonable assurance that the flange could safely operate until the next refueling outage. Additionally, Exelon prepared an adverse condition monitoring plan and is performing periodic remote monitoring of the affected flange for changes in the leakage.

Analysis. The inspectors determined that Exelon's failure to provide specific technical guidance on the desired inspection scope and the criteria to be used to report results for evaluation and disposition to ensure that the RCP thermal barrier flanges were visually inspected for the complete 360 degrees of both the upper and lower flanges of all RCPs is a performance deficiency which was within the Exelon's ability to foresee and prevent. Additionally, Exelon's verbally stated objective, to inspect 360 degrees of each flange and the specific conditions to report for evaluation and disposition, has not been communicated to inspection personnel through appropriate instructions, procedures and drawings.

The finding is more than minor because it is associated with the Equipment Performance attribute (a degraded RCP flange gasket) of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Also, this finding is similar to more than minor example 4.a of IMC 0612, Appendix E. The inspectors completed IMC 0609.04, "Phase 1 Initial Screening and Characterization of Findings," and concluded the finding is of very low safety significance (Green) after answering 'no' to question 1 of Table 4a under the initiating events cornerstone column. The finding has a cross cutting aspect in the area of Human Performance, Work Control because Exelon did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported. [H.4(c)]

Enforcement. 10 CFR 50, Appendix B, Criterion V. Instructions, Procedures and Drawings, requires that activities affecting quality shall be prescribed by documented instructions, procedures or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to the above, prior to and during the 2011 refueling outage, Exelon did not provide documented instructions, procedures and drawings specifying the inspection scope and the inspection acceptance criteria to be used when conducting boric acid inspections on the upper and lower thermal barrier flanges of the reactor coolant pumps. The thermal barrier flanges and the RCPs are safety-related components of the American Society of Mechanical Engineers Class 1 piping system. Exelon completed a boric acid evaluation which showed there was reasonable assurance that the flange could safely operate until the next refueling outage and is performing periodic remote monitoring of the affected flange for changes in leakage from the degraded gasket. Because this finding is of very low safety significance and it was entered into the licensee's corrective action program as IR 01344561, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. (**NCV 05000289/2012002-02, Inadequate Inspection of RCP Flanges**)

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

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training for the 'E' operator crew on January 18, 2012, which included a turbine trip without an automatic reactor trip and a subsequent steam generator tube leak. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors observed and reviewed main control room activities on February 3 and February 24, 2012 during deep backshift inspections. The inspectors observed test and evolution briefings, pre-shift briefings, and reactivity control briefings to verify that the briefings met the criteria specified in Exelon's OP-AA-1, "Conduct of Operations," Revision 000. Additionally, the inspectors observed licensed operator performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

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

- Intake screen pump house structural inspection, February 8, 2012 (IR 1328444)
- IA-P-4 motor overload trips and subsequent air leak repairs, February 15, 2012 (IR 1295235)

b. Findings

Introduction. A Green self-revealing finding was identified for inadequate performance monitoring of instrument air compressor number four (IA-P-4) in accordance with ER-AA-2003, "System Performance Monitoring and Analysis." Specifically, performance monitoring action levels established for loaded and unloaded times in 1104-25, "Instrument and Control Air System," were not adequate to identify the adverse trend in performance and resulted in recurring drive motor overload trips and accrued unplanned unavailability of IA-P-4 on September 28, October 8, and November 29, 2011.

Description. IA-P-4 is the normal supply of compressed air for the instrument and service air systems. The instrument air system supports the control and manipulation of plant components important to safety and service air provides the remaining non-safety compressed air loads. IA-P-1A and 1B are the standby air compressors capable of providing compressed air for the instrument air system.

On September 28, and October 8, 2011, IA-P-4 unexpectedly tripped on drive motor overload while aligned to supply compressed air to the instrument air system. The standby instrument air compressors started as designed and maintained instrument air pressure within its required band and no plant transient occurred. The station entered into an unplanned Yellow risk condition with IA-P-4 unavailable. Troubleshooting identified that a thermal overload contactor was found tripped which caused the motor overload trip. The impact of increased instrument air load was not thoroughly evaluated during troubleshooting. Corrective actions included replacement of a thermal overload contactor and revalidation of thermal overload contactor design set points for the IA-P-4 motor.

An apparent cause evaluation was initiated after the third IA-P-4 drive motor overload trip, which occurred on November 29, 2011. The evaluation identified that the performance monitoring criteria for IA-P-4 was inadequate to identify an adverse trend in system performance. ER-AA-2003 establishes the minimum standards for system performance monitoring and requires station procedures to maintain adequate acceptance criteria to identify degraded conditions. Contrary to the above, procedure 1104-25 establishes acceptance criteria for IA-P-4 loaded and unloaded run times as applicable only when supplying loads to the instrument air system. IA-P-4 is normally aligned to supply air to both instrument and service air systems therefore, the loaded/unloaded run times were not evaluated against the established acceptance criteria. The established acceptance criteria did not represent appropriate monitoring of the actual use and line-up of IA-P-4. In addition, the inspectors noted that the system performance monitoring plan for the instrument air system did not track and trend the loaded/unloaded run times for IA-P-4. Therefore, an adverse trend in increased air demand on IA-P-4 due to system leakage was not identified and resulted in the recurring motor overload trips and accrued unplanned unavailability of IA-P-4.

Exelon performed a focused inspection of the IA system piping and identified 15 previously unidentified air leaks (IR 1301977). Maintenance technicians repaired air leaks and subsequent IA-P-4 air loading decreased. Corrective actions were implemented to trend loaded and unloaded times of IA-P-4 in the system monitoring plan and implement acoustic monitoring for identification of system air leakage (IR 1295235).

Analysis. The performance deficiency associated with this finding involved Exelon's failure to perform adequate performance monitoring of instrument air compressor 4 (IA-P-4) in accordance with ER-AA-2003, "System Performance Monitoring and Analysis," and was within the licensee's ability to foresee and correct. This finding is more than minor because it was associated with the equipment performance attribute of the Initiating Events cornerstone and affected the cornerstone object of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations.

In accordance with IMC 0609.04, "Phase 1 - Initial Screen and Characterization of Findings," the inspectors conducted a phase 1 SDP screening and determined that a detailed phase 2 evaluation was required to assess the safety significance because the finding contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment would not be available. The inspectors consulted a senior risk analyst (SRA) to perform a detailed phase 2 analysis in accordance with IMC 0609 Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations." The SRA performed a bounding risk analysis using five days of IA-P-4 unavailability based upon the outage durations associated with the finding. The dominant core damage sequence for IA-P-4 failure to start and run is bounded by a loss of station air coincident with a steam generator tube rupture transient and loss of the 1A DC bus, resulting in a delta CDF of 2.350E-7/yr. The two safety-related instrument air compressors remained operable and limited the significance. Because the phase 2 analysis concluded that the delta CDF is less than 1E-6/yr, the significance of the finding was of very low safety significance (Green).

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to thoroughly evaluate the cause of the IA-P-4 trips such that the resolution addressed the cause [P.1(c)].

Enforcement IA-P-4 is not a safety-related component. Therefore, this finding does not involve enforcement action because no regulatory requirement violation was identified. Because this finding was of very low safety significance (Green) and Exelon entered this issue into their corrective action program as IR 1295235, it is identified as a FIN. (**FIN 05000289/2012002-03, Inadequate System Monitoring Results in Multiple IA-P-4 Trips**)

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

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 60.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical

specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Emergency diesel generator 'B' was removed from service for a planned maintenance outage on January 11-12, 2012
- DH-V-3 breaker preventive maintenance on January 16, 2012
- Planned engineered safeguards actuation system relay replacements during the week of February 7, 2012
- Planned make-up pump 'A' maintenance outage on March 6-8, 2012
- Decay heat cooler 'B' risk while the shell-side cooler bypass valve (DC-V-65B) actuator was tested on March 14

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for Exelon's failure to adequately assess and manage the impact to plant risk during a planned maintenance activity. Specifically, Exelon did not recognize an elevated online maintenance risk activity and implement appropriate risk management actions (RMAs) during maintenance on the decay heat removal (DHR) drop line valve (DH-V-3) on January 16, 2012.

Description. On January 16, 2012, Exelon removed DH-V-3 from service for planned electrical maintenance to perform molded case circuit breaker testing per E62.2, "Molded Case Circuit Breaker Testing - Instantaneous Trip." The preventive maintenance task was completed satisfactorily and the valve was returned to service on January 17, 2012 for a total out-of-service time of eight hours. During the planned maintenance outage, DH-V-3 was in the closed position with its associated circuit breaker removed, disabling the remote open function of the valve. In this configuration, the inspectors identified that DH-V-3 was inoperable and unavailable. Exelon failed to identify that the 'B' DHR train was inoperable in accordance with OP-TM-212-000, "Decay Heat Removal System," and that limiting condition for operation (LCO) 3.3.1 should have been entered. In addition, the inspectors identified that an adequate risk assessment was not performed to evaluate plant risk for the loss of function to remotely operate DH-V-3 in accordance with WC-AA-101, "On-line Work Control Process."

DH-V-3 performs specific safety functions in the closed and open positions that support the technical specification operability and maintenance rule availability of the DHR system. The standby condition of DH-V-3 is closed to isolate the reactor coolant system hot leg from the DHR system and performs a containment isolation function. In addition, DH-V-3 must open to support the long term cooling function of decay heat removal as well as provide post loss of coolant accident (LOCA) boron precipitation control capability. Based upon the standby valve lineup, availability of DH-V-3 directly impacts the availability and operability of the 'B' DHR train.

After the inspectors conveyed this issue to Exelon, they performed a past unavailability risk assessment of DH-V-3 and determined that an elevated station risk condition existed during the maintenance activity. The planned maintenance activity was incorrectly determined, by the licensee, to not impact the technical specification or

maintenance rule function of the DHR system during the maintenance activity. As a result, LCO 3.3.1 was not entered and the plant incorrectly remained in a Green station risk condition for the duration of the maintenance activity. The inspectors reviewed the maintenance and operations records and identified that appropriate RMA's were not implemented to mitigate the elevated risk condition.

Exelon entered this issue into their corrective action program as IR 1314551. Immediate corrective actions included operator and work planning training on risk evaluations and an extent of condition review to ensure planned maintenance activities that could impact DHR system operability were identified. A past operability review was performed to confirm that DH-V-3 had not been removed from service greater than the LCO allowed time. Exelon performed a common-cause analysis for recent risk management performance issues, including the inadequate risk assessment for DH-V-3. Additional corrective actions included adding a technical rigor challenge meeting prior to work implementation.

Analysis. The inspectors determined that the failure to perform an adequate risk assessment and implement appropriate RMA's for the planned maintenance on DH-V-3 is a performance deficiency that was within Exelon's ability to foresee and correct. This finding was determined to be more than minor in accordance with IMC 0612, Power Reactor Inspection Reports, Appendix E, example 7.e, because the risk assessment, when adequately performed, resulted in an elevated station risk condition and required RMA's. In accordance with Inspection Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," the inspectors determined the finding affected the mitigating systems cornerstone and Exelon's assessment and management of risk associated with performing maintenance activities. Therefore the inspectors conducted a phase 1 SDP screening using IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." The inspectors, in consultation with an SRA, performed a phase 1 analysis and concluded that the incremental core damage probability deficit for DH-V-3 with an out-of-service time of 8 hours was less than 1E-6. Therefore, the finding was determined to be of very low safety significance (Green).

This finding has a cross-cutting aspect in the area of Human Performance, Work Control, because Exelon failed to incorporate appropriate risk insights into the planning and execution of the DH-V-3 maintenance activity [H.3(a)].

Enforcement. 10 CFR 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," requires, in part, that the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, on January 16, 2012, Exelon did not adequately assess and manage the impact to plant risk during a planned DH-V-3 maintenance activity. Specifically, Exelon did not appropriately assess and manage, via appropriate RMAs, the elevated risk condition. Immediate corrective actions included operator and work planning training on risk evaluations and an extent of condition review to ensure planned maintenance activities that could impact DHR system operability were identified. Because this issue is of very low safety significance (Green) and Exelon entered this issue into their corrective action program as IR 1314551, this finding is being treated as an NCV consistent with the NRC Enforcement Policy. (**NCV 05000289/2012002-04, Failure to Perform an Adequate Maintenance Risk Evaluation for DH-V-3 Planned Maintenance**)

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)

a. Inspection Scope

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

- Underground leakage from the 'A' decay river water system on January 9, 2012
- MU-V-14A valve manual operation issues on January 22, 2012
- Off-site power and degraded voltage logic in relation to operating experience review of a postulated loss of phase event on February 4, 2012
- Reactor building purge exhaust valve (AH-V-1A) stroke time and downstream piping issues on February 29, 2012
- 'A' nuclear river pump (NR-P-1A) high vibrations during testing on March 10, 2012

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

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 3 samples)

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- Engineering Change Report 12-00013, "New Administrative Operating Limits for TMI-1 Cycle 19"
- Engineering Change Report 12-00013 [LTOP], "Review of the Low Temperature Overpressure Protection Setpoint"

b. Findings

No findings were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors evaluated a modification to the reactor building (RB) purge valve closing stroke times implemented by engineering change package ECR 12-00121-000, "RB Purge Valve Closing Stroke Time." The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change, including review of supporting bases and calculations. The inspectors also reviewed revisions to the surveillance test documents.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

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

- 'A' reactor river pump 1A planned maintenance on January 4, 2012
- 'A' reactor river system relay replacement on January 6, 2012
- Makeup system valve relay replacement on January 25, 2012
- Nuclear service pump 1A planned maintenance on February 7, 2012
- Power operated relief valve low-temperature setpoint change on February, 9, 2012
- Makeup pump 1A planned maintenance on March 8, 2012

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)

a. Inspection Scope

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

- 1303-4.16, Emergency Power System ('A' EDG diesel fuel oil transfer pump test) on January 12, 2012
- OP-TM-214-202, IST of BS-P-1B and Valves on January 19, 2012 (in-service test)
- OP-TM-823-201, Stroke Time Testing of AH-V-1A , on January 30, 2012 (containment isolation valve)
- 1303-4.16, Emergency Power System ('A' EDG monthly surveillance run) on February 8, 2012
- OP-TM-211-213, IST of MU-V-16C and MU-V-16D on February 24, 2012 (in-service test)

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation

a. Inspection Scope (71114.02 - 1 sample)

An onsite review was conducted to assess the maintenance and testing of the Alert and Notification System (ANS). During this inspection, the inspectors interviewed the EP staff responsible for the oversight of the ANS testing and maintenance programs. The inspectors reviewed the associated ANS procedures and the Federal Emergency Management Agency approved ANS Design Report to ensure compliance with design report commitments for system maintenance and testing. Title 10 of the Code of Federal Regulations (10 CFR) 50.47(b)(5) and the related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP3 Emergency Preparedness Organization Staffing and Augmentation System

a. Inspection Scope (71114.03 - 1 sample)

The inspectors conducted a review of the Three Mile Island Emergency Response Organization (ERO) augmentation staffing requirements and the process for notifying and augmenting the ERO. The review was performed to verify the readiness of key

licensee staff to respond to an emergency event and to verify Exelon's ability to activate their emergency response facilities (ERF) in a timely manner. The inspectors reviewed the Exelon Nuclear Standard Emergency Plan and the Three Mile Island Emergency Plan Annex for ERF activation and ERO staffing requirements, the corporate and station ERO duty rosters, applicable station procedures, augmentation reports, the 2009 call-in/drive-in drill memo, and IRs related to this area. The inspectors also reviewed a sample of ERO responder training records to verify training and qualifications were up to date. 10 CFR 50.47(b)(2) and related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP5 Correction of Emergency Preparedness Weaknesses

a. Inspection Scope (71114.05 - 1 sample)

The inspectors reviewed a sample of drill reports, 10 CFR 50.54(t) audit reports, self-assessments, and EP-related IRs to assess Exelon's ability to evaluate their EP program and its performance. The inspectors reviewed a sample of IRs initiated by the Exelon staff at Three Mile Island from drills, self assessments, and audits from January 2010 through March 2012. A walk-down of the control room was conducted to inspect out-of-service equipment important to emergency preparedness and the implementation of the compensatory measure. The walk-down included an interview with the Control Room Shift Supervisor and observations of equipment used to alert the ERO during an emergency. 10 CFR 50.47(b)(14) and the related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 - 1 sample)

a. Inspection Scope

The inspectors evaluated the conduct of a routine Exelon emergency drill on January 18, 2012 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator and technical support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspectors' observations with those identified by Exelon staff in order to evaluate Exelon's critique and to verify whether Exelon staff was properly identifying weaknesses and entering them into the corrective action program.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2RS01 Radiological Hazard Assessment and Exposure Controls (71124.01)

a. Inspection Scope

During the period January 9 - 13, 2012, the inspectors conducted the following activities to verify that the licensee was evaluating, monitoring, and controlling radiological hazards for work performed in locked high radiation areas (LHRA) and other radiological controlled areas, and that workers were adhering to these controls when working in these areas. Implementation of these controls was reviewed against the criteria contained in Title 10 of the Code of Federal Regulations (10 CFR) Part 20, Technical Specifications, and the licensee's procedures.

Radiological Hazards Control and Work Coverage

The inspectors identified areas at TMI where radiologically significant work was being done. The inspectors reviewed radiation survey maps and radiation work permits (RWP) associated with these areas to determine if the associated controls were acceptable. The inspectors interviewed selected workers to determine if the workers were informed of the radiological conditions at the job site, electronic dosimeter alarm set points, and actions to be taken if a dosimeter alarms. Specific work activities observed included preparations for making a reactor containment entry during power operations.

The inspectors toured the accessible radiological controlled areas in the plant, including the auxiliary building, fuel handling building, and waste handling building, and performed independent surveys of selected areas to confirm the accuracy of survey data, the adequacy of postings, and the location of airborne sampling instruments. During this tour, the inspectors verified that selected LHRA were properly secured and posted.

In evaluating the RWPs, the inspectors reviewed electronic dosimeter dose/dose rate alarm set points to determine if the set points were consistent with the survey indications and plant policy. The inspectors verified that workers were knowledgeable of the actions to be taken when the dosimeter alarms, or malfunctions, for tasks being performed under selected RWPs.

Problem Identification and Resolution

A review of a nuclear oversight daily audit report and IRs related to implementing radiological controls was conducted to determine if identified problems and negative performance trends were identified and entered into the corrective action program, and evaluated for resolution.

Relevant IRs, associated with radiation protection control access and radioactive source control and personnel exposure investigation reports, were reviewed and discussed with the licensee staff to determine if the follow up activities were being conducted in an effective and timely manner, commensurate with their safety significance. The inspectors also reviewed the electronic dosimeter dose and dose rate alarm reports to

determine that for every alarm, an issue report was initiated and that the cause was appropriately established.

High Radiation Area and Very High Radiation Area Controls

Procedures for controlling access to High Radiation Areas (HRA) and Very High Radiation Areas (VHRA), were reviewed to determine if the administrative and physical controls were adequate. The inspectors conducted an inventory of LHRA/VHRA keys and verified that key control logs accounted for all issued keys. The inspectors discussed with radiation protection management, the adequacy of current LHRA/VHRA controls, including prerequisite communications and authorizations, and verified that any changes made to relevant procedures did not substantially reduce the effectiveness and level of worker protection.

Radiation Worker Performance and Radiation Protection Technician Performance

The inspectors observed and questioned radiation workers and radiation protection technicians regarding radiological controls applied to various RWP tasks. The inspectors determined that the workers were aware of current RWP requirements, radiological conditions, access controls, and that the skill level was appropriate with respect to the potential radiological hazards and the work being performed.

The inspectors attended the radiation protection department daily planning meeting to assess the level of detail provided to workers regarding planned work activities, including the job hazards assessment, industrial safety measures, and radiological controls.

The inspectors reviewed IRs related to radiation worker, radiation protection technician errors, and personnel contamination event reports to determine if an observable pattern traceable to a similar cause was evident.

Contamination and Radioactive Material Control

At the radiological controlled area control point, the inspectors observed workers surveying and releasing potentially contaminated materials for unrestricted use. The inspectors verified that the counting instrumentation was located in a low background area and that the instruments sensitivity was appropriate for the type of contamination being measured.

The inspectors reviewed the procedure and associated controls for issuing and accounting for radioactive check sources, which are routinely used for verifying the operability of radiation monitoring instruments. The inspectors reviewed source logs and confirmed that radioactive sources were accounted for.

b. Findings

No findings were identified.

2RS02 Occupational As Low As is Reasonably Achievable Planning and Controls (71124.02)

a. Inspection Scope

During the period January 9 - 13, 2012, the inspectors conducted the following activities to verify that the licensee was properly implementing operational, engineering, and administrative controls to maintain personnel exposure as low as is reasonably achievable (ALARA) for tasks performed in radiological controlled areas. Implementation of these controls was reviewed against the criteria contained in 10 CFR Part 20, applicable industry standards, and the licensee's procedures.

Radiological Work Planning

The inspectors reviewed pertinent exposure information regarding the fall 2011, 1R19 refueling outage, current exposure trends, and ongoing activities to assess ALARA performance. A review of 2011 outage dose was conducted to compare actual exposures with forecasted estimates to determine if differences were properly addressed in post-job ALARA reviews.

The inspectors evaluated the departmental interfaces between radiation protection, operations, maintenance crafts, and engineering to identify missing ALARA program elements and interface problems. The evaluation was accomplished by reviewing station ALARA committee meeting minutes and a nuclear oversight audit, and interviewing the managers of radiation protection and of radiological engineering.

Verification of Dose Estimates

The inspectors reviewed the assumptions and basis for the annual (2011) site collective dose, exposure projections, and actual exposure data for routine power operations. The inspectors reviewed the effectiveness of initial job planning measures and the licensee's efforts in monitoring and controlling dose during job completion.

The inspectors reviewed the licensee's procedures associated with monitoring and re-evaluating dose estimates when the forecasted cumulative exposure for tasks differed from the actual exposure received. The inspectors reviewed the dose/dose rate alarm reports, and exposure data for selected individuals receiving the highest total effective dose equivalent for 2011, to confirm that no individual exposure exceeded the regulatory limit, or met the performance indicator reporting guideline.

The inspectors reviewed dosimeter-of-record data with dose measured on electronic dosimeters, for selected workers, to determine if significant differences occurred. The inspectors confirmed that all dose differences greater than 25 percent were evaluated and resolved, as required the licensee's procedure. Additionally, the inspectors reviewed the procedure and associated data for determining worker's external effective dose equivalent for selected tasks, to confirm that the procedural requirements were properly implemented.

Jobs-In-Progress

The inspectors observed the preparations being made for a reactor containment entry to evaluate the effectiveness of dose and contamination control measures. As part of this evaluation, the inspectors reviewed ALARA briefing materials, reviewed the RWP and associated survey maps, and evaluated dosimetry and contamination control measures.

Problem Identification and Resolution

The inspectors reviewed elements of the licensee's corrective action program related to implementing ALARA program controls, including IRs, a nuclear oversight audit, and dose/dose rate alarm reports, to determine if problems were being entered at a conservative threshold and resolved in a timely manner.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams and Transients (3 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittal for the following performance indicators for TMI from January 2011 through December 2011:

- Unplanned Scrams per 7000 Critical Hours
- Unplanned Scrams With Complications
- Unplanned Transients per 7000 Critical Hours

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed operator logs, licensee event reports, monthly station operating reports, corrective action program database documents, calculation methods, definition of terms, and use of clarifying notes. The inspectors also verified accuracy of the number of reported critical hours used in the calculations.

b. Inspection Findings

No findings were identified.

.2 EP Performance Indicators

a. Inspection Scope

The inspectors reviewed data for the three EP Performance Indicators (PI), which are: (1) Drill and Exercise Performance; (2) ERO Drill Participation; and, (3) ANS Reliability. The last NRC EP inspection at Three Mile Island was conducted in the first quarter of 2011; the inspectors reviewed supporting documentation from EP drills, training records, and equipment tests from the first calendar quarter of 2011 through the fourth quarter of 2011, to verify the accuracy of the reported PI data. The review of the PIs was conducted in accordance with NRC Inspection Procedure 71151. The acceptance criteria documented in NEI 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 6, was used as reference criteria.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152 – 2 annual samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

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

b. Findings

No findings were identified.

.2 Annual Sample – Foreign Material Identified in Fuel Oil Tank (1 sample)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's cause evaluation and corrective actions associated with IR 1137809, FME Issue in 30K Tank and IR 1282975, DF-T-1 FME Recovered More Material Than Previously Evaluated. Specifically, numerous pieces of tape were identified at the bottom of the emergency diesel generator (EDG) main fuel oil storage tank (DF-T-1) which had the potential to clog the suction piping to the EDG fuel oil day tanks.

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

b. Findings and Observations

No findings were identified.

Exelon determined that the most probable source of the tape identified in DF-T-1 was from a tool maintained by chemistry used to take samples of the fuel oil in DF-T-1. Exelon determined that the sampling tool contained multiple pieces of duct tape and

while inserting and removing the tool during sampling in DF-T-1, pieces of the tape had fallen off and dropped to the bottom of the tank.

TMI has two EDGs, each with independent fuel oil storage day tanks, DF-T-2A/B, and a common 7 day supply storage tank, DF-T-1. Fuel oil maintained in DF-T-1 is transferred to DF-T-2A and B via fuel oil transfer pumps. Exelon performed an in-depth analysis to determine if the FME, identified in the tank, would impact the fuel oil transfer function and affect the two EDG's credible run time. Exelon determined that the fuel oil transfer function would have been maintained with the FME in DF-T-1 and the two EDG's would be able to perform their safety function.

Exelon's immediate corrective actions were to design and construct a new sampling tool that contained no material that could be dropped into the tank. Furthermore, Exelon retrieved the pieces of tape from the bottom of DF-T-1 on October 28, 2011 during a refueling outage. Exelon's extent of condition review evaluated all site sampling equipment for similar configurations and identified no additional issues.

The inspectors reviewed site sampling activities and tools used to implement these tasks and did not identify any additional issues. The inspectors determined Exelon's overall response to the issue was commensurate with the safety significance, was timely, and included appropriate compensatory actions. The inspectors determined that the actions taken were reasonable to resolve the concern of foreign material impact in DF-T-1 and prevention of additional foreign material being introduced into DF-T-1.

.3 Annual Sample – TMI Flooding Analysis (1 sample)

a. Inspection Scope

The inspectors performed a review of Exelon's 2010 evaluation "Three Mile Island Nuclear Facility Flood Risk Study Middletown, Pennsylvania," dated September 26, 2011. The evaluation updates the original licensing basis flooding analysis using new methodologies. The review was conducted to verify that the outputs of the 2010 evaluation were reasonable. The original probable maximum flood (PMF) at the site was defined by the U.S. Army Corps of Engineers (USACE) in 1967; a revised value of the PMF was issued by USACE in 1969. Corrective actions developed from Exelon's 2010 evaluation were previously inspected and documented in IR 05000289/2011005. The inspectors interviewed Exelon staff and reviewed the aforementioned report, which documents background information, methodologies and results associated with the flood risk study. The information contained in the report was reviewed against the methodologies contained in the report's cited references. A full list of licensee and third-party documents reviewed as part of the NRC review is contained in the attachment to this report. In March 2012, the NRC issued orders to all power reactors to reevaluate the flooding hazards at their site using present-day methods and information. Exelon's 2010 evaluation pre-dates the March 2012 NRC requests.

b. Findings and Observations

No findings were identified.

The use of software and deterministic methodologies contained in the report to determine stillwater elevations is generally consistent with common practice. The effects of wind and wave activity on water surface elevations are not considered in the report

and this issue continues to be under NRC review (see URI 05000289/2011005-03). The inspector made several observations related to the frequency calculations, which did not affect the deterministic conclusions contained in the report relative to stillwater elevations at the site for the deterministic probable maximum flood of 1,625,000 cfs.

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

.1 Plant Events

a. Inspection Scope

For the plant event listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly evaluated reportability of the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors performed independent walkdowns and reviewed Exelon's follow-up actions related to the event to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance. Documents reviewed included issue report 1279432, 1328627, 1328813, and 1297521 and OP-TM-621-451, Selecting Alternate Instrument Inputs to ICS, Revision 3.

- Feedwater transient due to a failed feedwater control module on February 18, 2012

b. Findings

No findings were identified.

4OA5 Other Activities

.1 Temporary Instruction 2515/182, Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks, Phase 1 (2515/182 - 1 sample)

a. Inspection Scope

The licensee's buried piping and underground piping and tanks program was inspected in accordance with paragraphs 03.01.a through 03.01.c of the Temporary Instruction and was found to meet all applicable aspects of the Nuclear Energy Institute (NEI) document 09-14, Revision 1, as set forth Table 1 of the Temporary Instruction 2515/182.

b. Findings

No findings were identified.

.2 EA-11-034, Followup of Traditional Enforcement Actions (92702)

a. Inspection Scope

By letter dated November 2, 2011 (05000289/2011010, ML113060159), the NRC issued an NCV to Exelon related to the security program. Exelon documented the issue in IR 1199790.

The inspectors reviewed the licensee's corrective actions concerning the violation in accordance with the requirements of inspection procedure 92702. Per the letter issued by the NRC (ADAMS ML113060159), credit was given to the licensee for the immediate corrective actions. The inspectors reviewed the initial CR and interviewed security access and regulatory affairs personnel.

b. Observations and Findings

The inspectors determined the licensee's response and corrective actions were timely and appropriate since no further actions were needed after the initial response. Based on the document reviews, observations, and interviews, the inspectors concluded that adequate corrective actions were implemented for the documented NCV.

4OA6 Meetings, Including Exit

Quarterly Inspection Report Exit

On April 13, 2012, the inspectors presented the inspection results to Mr. Rick Libra, Three Mile Island Site Vice President and other members of the Three Mile Island staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

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

- TMI-1 fire hazard analysis requires two valves to achieve and maintain cold shutdown condition, including remote shutdown via local manual operation, one valve which is the 'B' decay heat cooler shell bypass (DC-V-65B). On March 14, 2012 during valve diagnostic testing, Exelon discovered DC-V-65B manual handwheel drivegear was detached from the valve stem and had been so since identified on April 19, 2006. Contrary to license condition 2.C.(4) compensatory measures were not established for the loss of DC-V-65B to be operated manually and to perform its credited function. The cause of this violation is the failure to correct a degraded condition in a timely manner commensurate with its safety significance. Exelon entered this into the CAP as IR 1341582 and replaced the actuator on April 3, 2012. The inspectors determined that the finding was of very low safety significance (Green) in accordance with IMC 0609, Appendix F, "Fire Protection Significance Determination Process," as a cold shutdown category with moderate degradation.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Atherholt	Manager, Regulatory Assurance
P. Bennett	Manager, Design Engineering - Mechanical
M. Benson	TMI Boric Acid Corrosion Control Program Manager
W. Carsky	Director, Site Engineering
J. Cavanaugh	Design Engineering
G. Ciraula	TMI Programs Supervisor
S. Cogley	Senior Chemist
M. Cursey	Risk Management Engineer
D. Divittore	Manager, Site Radiation Protection
R. Ezzo	System Engineer
M. Fitzwater	Senior Regulatory Assurance Engineer
T. Ginder	ExelonTMI, NDE Level III
R. Green	Buried Piping Program Manager
T. Haaf	Director, Site Operations
C. Incorvati	Director, Maintenance
E. Johnson	Buried Piping Engineer
J. Karkoska	Manager, Site Security
A. Krause	Supervisor, Engineering
R. Libra	Site Vice President
R. Masoero	System Engineer-Inservice Testing Program Owner
G. McCarty	Manager, RP Technical Support
W. McSorley	Design Engineer
D. Neff	Manager, Emergency Preparedness
J. Newman	Emergency Preparedness Coordinator
T. Orth	Manager, Chemistry
E. Parido	Senior Radiation Protection Technician
J. Piazza	Senior Manager, Design Engineering
W. Price	Shift manager
M. Reed	System Engineer
T. Roberts	Manager, Radiological Engineering
J. Schork	Training Supervisor
C. Shorts	System Engineer
B. Shumaker	Emergency Preparedness Manager
S. Wilkerson	Manager, Design Engineering – Electrical and Instrumentation & Control

NRC Personnel

M. Bensi	External Events Scientist, Office of Research

Other

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

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Open/Closed

05000289/2012002-01	NCV	Failure to Implement Fire Protection Compensatory Actions for Out-of-Service Appendix R Heat Exchanger (Section 1R04)
05000289/2012002-02	NCV	Inadequate Inspection of RCP Flanges (Section 1R08)
05000289/2012002-03	FIN	Inadequate System Monitoring Results in Multiple IA-P-4 Trips (Section 1R12)
05000289/2012002-04	NCV	Failure to Perform an Adequate Maintenance Risk Evaluation for DH-V-3 Planned Maintenance (Section 1R13)

Closed

05000289/2011005-01	URI	Inspect and Disposition Leakage of B RCP Flange from 1R19 (Section 1R08)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather

Procedures

1107-11, TMI Grid Operations, Revision 24
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 6
OP-TM-108-111-1001, TMI Site Inaccessibility Plan, Revision 6
OP-TM-AOP-002, Flood, Revision 5

Surveillance

3301-SA1, Dike Inspection, Revision 15, conducted March 13 and March 14, 2012

IRs

1348773 1346290 1341027 1341537 13441244 1350042 1350046

Other

ECR 11-00426, Raise Level of External Flood Protection, Revision 1
TS 3.14.2, Flood Condition for Placing the Unit in HSB, Amendment 157.
TS 3.14.2 AL 98-10 Compensatory for Non-conservative elevation, dated December 7, 2011
WO C2027442, Reactor Building Seismic/Flood Seal Inspection and Repair, March 14 through March 16, 2012.

Section 1R04: Equipment Alignment

Procedures

LS-AA-128, Regulatory Review of Proposed Changes to the Approved Fire Protection Program, Revision 1
OP-TM-211-000, Makeup and Purification System, Revision 24
OP-TM-533-000, Decay Heat River System, Revision 10

OP-TM-533-252, DR Train B Leakage Exam, Revision 7
OP-TM-533-281, Decay Heat River ES Standby/DHR Standby Mode Lineup Verification, Revision 3
OP-TM-541-000, Primary Component Cooling, Revision 15

Drawings
302-202, River Water System Flow Diagram, Revision 77
302-645, Decay Heat Flow Diagram, Revision 39
302-660, Make-up and Purification Flow Diagram, Revision 45
302-661, Make-up and Purification Flow Diagram, Revision 60

Other
ECR 07-00702, Add CO Valves to the FHAR and Change MU Valve Action Times, Revision 0
ECR 08-01051, Revise FHAR with CR Evacuation and Loss of Seal Cooling Strategy, Revision 0
Deviation of FHAR Requirements for NR-V-8A and 16A, 3/16/12
AR A2299613
CLR 10500072
IR 1153912 1347403 1339730 352410 727854
WO C2024167

Section 1R05: Fire Protection
Procedures
1-FHA-038m Fire Area Layout Control Tower, Revision 6
990-1745, Fire Hazard Analysis Report, Revision 24
1038, Administrative Controls-Fire Protection Program, Revision 76
1104-29Z, Heating WDL-T-6A/6B/7A/7B with Aux Hot Water System, Revision 0
1303-12.8F, Fire Protection Instrumentation Auxiliary Building/Fuel Handling Building Functional Test, Revision 39
1420-Y-30, Repair of Appendix R Cold Shutdown and Remote Shutdown System Circuits, Revision 16
CC-AA-309-101, Engineering Technical Evaluations, Revision 11
OP-TM-232-587, Heating “A” CWST and RBATS with the Aux Hot Water System, Revision 1
OP-MA-201-007, Fired Protection System Impairment Control, Revision 6
Three Mile Island Nuclear Station Pre-Fire Plan, Revision 2

Drawings
1-FHA-038, Fire Area Layout Control Tower, Revision 6

Other
WO R2170830
TMI-1, Fire Hazards Analysis, Revision 24

Section 1R06: Flood Protection Measures
Procedures
MA-TM-153-001, Inspection and Maintenance of TMI-1 Electrical and Telephone Manholes, Revision 1

Other
IRs: 1345824, 1345831
Work Order C202708202, E-22 Electrical Vault Inspection

Work Order C202708201, E-21 Electrical Vault Inspection
Work Order R217687801, E-14 Electrical Vault Inspection
Work Order R217685401, E-10 Electrical Vault Inspection

Section 1R08: Inservice Inspection (ISI) Activities

IRs

AR01288964, (11/10/11)*
AR01287289, (11/7/11)*
AR01339037, (3/19/12)*
AR01344733, (3/23/12)*
AR01344561, (3/22/12)*
AR 02184342, (11/1/11)
AR A2236979, (11/15/11)
AR A2236981, (11/13/11)
AR A2236977, (11/13/11)
AR A2236978, (11/13/11)
*Denotes this report was generated as a result of this inspection.

Drawings

GPU Nuclear dwg. 1E-153-02-002, Revision 6; General Arrangement, Reactor Building, Plan Floor El 308'-0"
AmerGen dwg. 302-031, Revision 9; Composite Start Up, Flow Diagram
Westinghouse dwg. 689J030, Sheet 1, Revision 11; Outline, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 1 of 7; General Assembly, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 2 of 7; General Assembly, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 3 of 7; General Assembly, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 4 of 7; General Assembly, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 5 of 7; General Assembly, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 6 of 7; General Assembly, Shaft Seal Pump
Westinghouse dwg. 689J031, Sheet 7 of 7; General Assembly, Shaft Seal Pump

Engineering Evaluations, Analyses, Calculations & Standards:

Cause Determination, Reactor Coolant Pump 1C Main Flange Leakage (13R), Report # 990-2580, 10/26/99
Engineering Technical Evaluation 1284342-03 (BACC Evaluation of RC-P-1B Flange Leak) TDR-946, 12/29/98; TMI-1 Evaluation of Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components
Engineering Technical Evaluation A2237152-01, Evaluation of IR990641
GPUN, TDR No. 946, TMI-1 Evaluation of Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components, 12/29/88
Operational Decision Making (ODM) #1284342, 11/12/11; PC-P-1B Main Flange Boric Acid Indications
TMI-1 50.59 Review 000226-005 and Safety Evaluation, SE-000226-005; Reactor Coolant Pump Main Flange Leakage, 10/11/97

System & Program Health Reports & Self-Assessments:

FASA SELF-ASSESSMENT REPORT: TMI Boric Acid corrosion Control Program FASA, 9/29/11
FOCUSED AREA SELF-ASSESSMENT REPORT, 2006 TMI; BACC PROGRAM, FASA AT #453726, May 22-26, 2006

Technical Specifications:
3.1.6. LEAKAGE and Bases; Amendment No. 271

Program Documents:
EPRI Report 1000975, November 2001; Boric Acid Corrosion Guidebook, Revision 1; Managing Boric Acid Corrosion Issues at PWR Power Stations
NEI 03-08 [Revision 2], January 2010; Guidelines for the Management of Materials Issues
NEI 97-06, Pressurized Water Reactor Steam Generator Examination Guidelines; Revision 7, Requirements 1013706, July 2006
WCAP-15988, Revision 1, February 2005; Generic Guidance for an Effective Boric Acid Inspection Program for Pressurized Water Reactors

Westinghouse Owner's Group Letter WOG 05-91, dated March 15, 2005; Subject: Transmittal of the Final Non-Proprietary Version of WCAP-15988-NP, Revision 1 Entitled "Generic Guidance for an Effective Boric Acid Inspection Program for Pressurized Water Reactors", February 2005, PA-MSC-0096

Procedures:
1102-11, Revision 96, 5/28/10; Plant Shutdown
ER-AP-330-1001, "Alloy 600 Management" and the ISI Augmented Inspection Program
ER-AP-331, Revision 5; Boric Acid Corrosion Control (BAAC) Program
ER-AP-331-1001, Revision 5; Boric Acid Corrosion Control (BACC) Inspection Locations, Implementation and Inspection Guidelines
ER-AP-331-1002, Revision 6; Boric Acid Corrosion Control Program Identification, Screening and Evaluation
ER-AP-331-1003, Revision 4; RCS Leakage Monitoring and Action Plan
ER-AP-331-1004, Revision 4; Boric Acid Corrosion Control (BACC) Training and Qualification
ER-AP-335-001, Revision 1; Bare Metal Visual Examination for Alloy 600/82/182 Materials
OP-TM-220-261, Revision 7, Reactor Coolant System VT-2 Exam
TMI-1, Unit 1, Reactor Coolant System Surveillance Procedure 1303-8.1, Revision 31, 9/3/01

Work Orders:
R2113285, Surveillance Test Procedure OP-TM-220-261, RCS VT-2, 1/22/10
R2152331, Recurring Task for RCP Flange Inspection

RCP Flange Video Tapes/DVDs, NDE Examination Reports & Data Sheets:
AREVA Visual Examination Data Sheet VE-RCP1B_A, 11/8/11
AREVA Visual Examination Data Sheet VE-RCP1D, 11/10/11
AREVA Visual Examination Data Sheet VE-RCP1B_A, 11/9/11, bolt degraded
AREVA Visual Examination Data Sheet VE-RCP1A, 11/4/11
2003 RCP Inspection Video Tapes
2005 RCP Inspection Video Tapes
2007 RCP Inspection Video Tapes
2011 RCP Inspection DVD Record

Miscellaneous Documents:
NRC Generic Letter 88-05; Boric Acid Corrosion Of Carbon Steel Reactor Pressure Boundary Components In PWR Plants
Three Mile Island, Unit 1; Reactor Coolant System Leak Rate Trend Graph, 1/20/10 to 10/26/11

Section 1R11: Licensed Operator Requalification

Procedures

EP-AA-122-1001-f-11, Self-Critical Guidance, Revision D
EP-AA-122-1001-F-12, Drill and Exercise Observation, Revision C
OP-AA-1, Conduct of Operations, Revision 000
OP-AA-100, Description of Exelon Nuclear Conduct of Operation Manual, Revision 000
OP-TM-EOP-001, Reactor Trip, Revision 11
OS-24, Conduct of Operations During Abnormal and Emergency Operations, Revision 19
TQ-TM-104-EP-2009-rD, EP Drill Scenario 2009-4, dated 1/11/12

Other

R2059650, CO-V-14A, Post Maintenance Test, dated February 24, 2012

Section 1R12: Maintenance Effectiveness

Procedures

1104-25, Instrument and Control Air System, Revision 145
ER-AA-310, Implementation of the Maintenance Rule, Revision 8
ER-AA-450, Structures Monitoring, Revision 0
ER-AA-2003, System Performance Monitoring and Analysis, Revision 9
ER-AA-2030, Revision 12
ER-TM-450, TMI Structures Monitoring Program, Revision 0
MA-AA-716-004, Revision 10
MA-AA-716-210, Performance Centered Maintenance (PCM) Process, Revision 12
U-1, Structural Facility Inspection, Revision 15

Other

IR	1274162	1295235	1296383	1301977	1303224	1318838
	1324804	1333490	1341940	1347214	1347230	1347233
	1347235	1347245	1347272	1347275		

Instrument Air System (852) Performance Monitoring Plan, 7/7/2010
Recurring IA-P-4 Trips on Drive Motor Overload, 2/3/12

Section 1R13: Maintenance Risk

Procedures

1082.1, TMI Risk Management Program, Revision 8
1302-14.1, Calibration of IST Related Instruments, Revision 66
1303-4.13, RB Emergency Cooling and Isolation Test, Revision 44
1303-4.19, HPI/LPI Analog Channel Functional Test, Revision 32
AP 1038, Administrative Controls – Fire Protection System, Revision 77
E62.2, Molded Case Circuit Breaker Testing – Instantaneous Trip, Revision 6
MA-AA-743-310, Diagnostic Testing and Evaluation of AOVs, Revision 5
OP-AA-108-117, Protected Equipment Program, Revision 1
OP-AA-108-117, Protected Equipment Program, Revision 2
OP-TM-212-000, Decay Heat Removal System, Revision 15
OP-TM-212-911, Post LOCA Reactor Vessel Boron Concentration Control, Revision 1
OP-TM-534-210, IST of RR-V-5 and RR-V-6, Revision 000
OP-TM-543-452, Local Manual Control of DC-V-2B and 65B, Revision 2
OP-TM-EOP-0201, Cooldown from Outside of Control Room, Revision 7
TMI-1 Fire Hazards Analysis Report, 990-1745
WC-AA-101, On-Line Work Control Process, Revision 18A

Drawings
302-452
302-545, Decay Heat Flow Diagram, Revision 39
302-645

Other
Adverse Trend for Tech. Spec. LCO and Station Risk Identification, 3/5/12
CLR 11501520
IRs: 00480592, 1314440, 1314551, 1317791, 1324039, 339047, 1341582
NER Brief for DC-V-65B, dated March 14, 2012
Technical Evaluation 1341582_02 Determine Alternate to Manual Operation of DC-V-65B for Controlling Cooldown Rate
TMI-1/UFSAR 14.2.2.3.3c
TMI-PRA-003, TMI Probabilistic Risk Analysis Success Criteria Notebook, Revision 0
TS 3.3, 3.3.1.1.d
WO R2068887
Workweek 1211 Schedule

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
ER-TM-700-403-101, Internal Surface Inspections, Revision 000
OP-AA-108-115, Operability Determinations, Revision 10
OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability Determinations, Revision 2
OP-MA-109-101, Clearance and Tagging, Revision 013
OP-TM-211-203, IST of MU-V-14A/B and DH-V-7A/B, Revision 3
OP-TM-541-234, IST of NR-P-1A and NRSW Valves during Single Pump Operation, Revision 2
OP-TM-MAP-F0301, RC Loop A Flow 10, Revision 0A
OP-TM-MAP-F0302, RC Loop B Flow 10, Revision 0A

Drawings
208-169, 4160V Switchgear, Sh. 1, Revision 26
208-169, 4160V Switchgear, Sh. 2, Revision 26
229153
302-202, Nuclear Service River Water System Flow Diagram, Revision 77
302-721
311-833
C-207-012, Three Line Diagram, Aux Tranformer1A and 1B Metering, Revision 4
E-207-031, Electrical Three Line Diagram, Synchronizing & Phasing, Revision 14
Map B, Main Annunciator Panel B, Revision 55A

Other
ACMP, 'A' DR Train Underground Leakage, Revision 0
ECR TM, 12-00121-000, RB Purge Valve Closing Stroke Time, 3/12/12
Evaluation A2240329-01, Comprehensive Pump Testing
IN 97-48, Inadequate or Inappropriate Interim Fire Protection Compensatory Measures, July 9, 1997
Operability Evaluation 12-002 for Byron Loss of Phase Event, 3/19/2012
Operability Evaluation, DR-P-1A Underground Discharge Piping, Revision 0
Technical Evaluation for Compensatory Actions for MU-V-14A, Revision 1

Technical Evaluation 1322450-02, TMI Response to AuxTransformer Single-Phase Event, 216/12
TM-1 UFSAR, Chapter 8, Electrical Systems, Revision 18

IRs	802386	802393	1201933	1312839	1316341	1316351
	1318427	1319908	1322414	1322450	1333165	1333602
	1335339	1339151	1339686	1340055	1340066	1340193
	1340493					
AR	A2202225	A2202226	A2294824			

Section 1R18: Plant Modifications

Procedures

1302-6.16, Setpoint and Remote Position Check of the PORV (RC-RC-2), Revision 16
1303-11.45, PORV Setpoint Check, Revision 36B
CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 20
CC-AA-103, Configuration Change Control, Revision 21

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RP-AA-210	Dosimetry Issue, Usage, and Control
RP-AA-401	Operational ALARA Planning and Controls
RP-AA-403	Administration of the Radiation Work Permit Program
RP-AA-403-1001	Radiation Work Permit Processing
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*Denotes this IR was generated as a result of this inspection

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LIST OF ACRONYMS

ACMP	Adverse Condition Monitoring Plan
ADAMS	Agencywide Documents and Management System
ALARA	As Low As Reasonably Achievable
ANS	Alert and Notification System
AP	Administrative Procedure
BAC	Boric Acid Corrosion
BACC	Boric Acid Corrosion Control Program
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
DH	Decay Heat
DHR	Decay Heat Removal
DRP	Division of Reactor Projects
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EPRI	Electric Power Research Institute
ER	Engineering Request
ERF	Emergency Response Facilities
ERO	Emergency Response Organization
FASA	Focused Area Self-Assessment
FHAR	Fire Hazard Analysis Report
GPUN	General Public Utilities Nuclear
HSD	Hot Shutdown
ICS	Integrated Control System
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
IST	Inservice Testing
LCO	Limiting Condition for Operation
LHRA	Locked High radiation Area
LOCA	Loss of Coolant Accident
NCV	Non-cited Violation
NDE	Nondestructive Examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
PADEP	Pennsylvania Department of Environmental Protection
PARS	Publicly Available Records
PI	Performance Indicator
PI&R	Problem Identification and Resolution
PMF	Probable Maximum Flood
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System

RMA	Risk Management Actions
RWP	Radiation Work Permit
SDP	Significance Determination Process
SRA	Senior Risk Analyst
SSC	Structures, Systems, and Components
TDR	Technical Document Report
TMI	Three Mile Island, Unit 1
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
USACE	US Army Corps of Engineers
VHRA	Very High Radiation Area
VT	Visual Examination
WO	Work Order